FIG. 1A

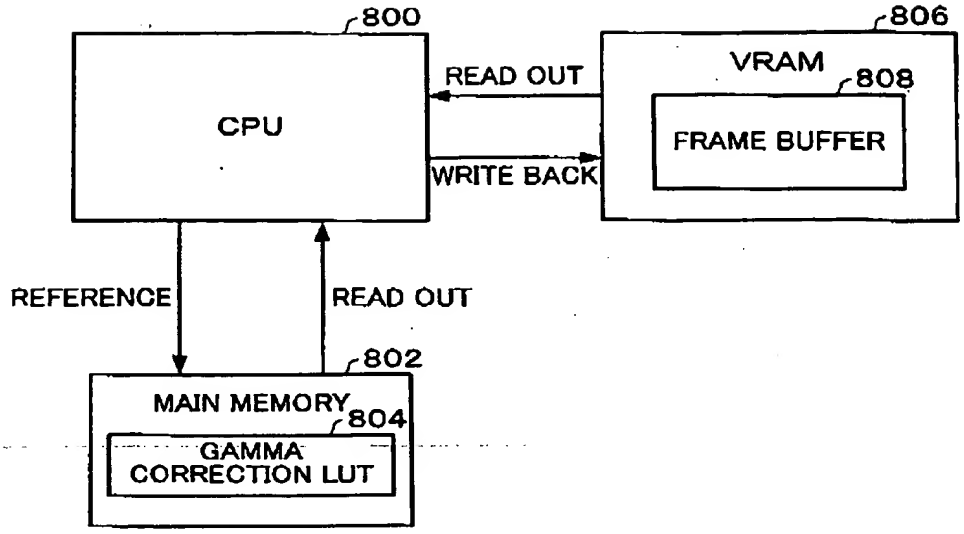


FIG. 1B

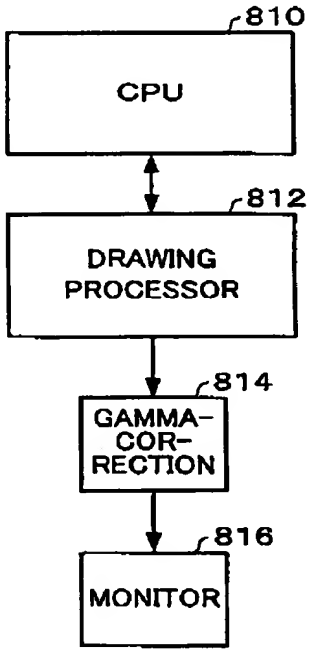


FIG. 2

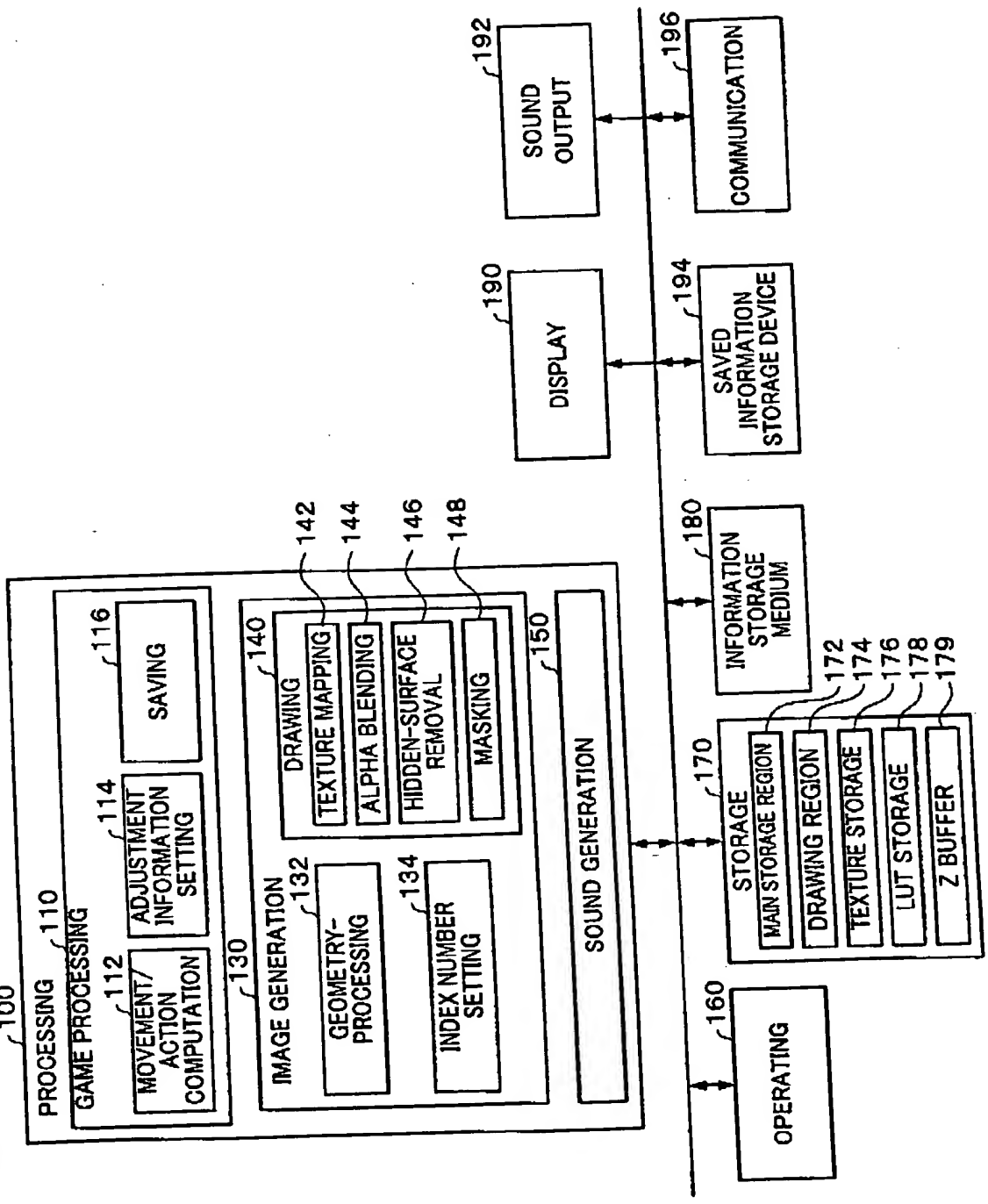

100
PROCESSING
110
GAME PROCESSING
112
MOVEMENT/ ACTION COMPUTATION
114
ADJUSTMENT INFORMATION SETTING
116
SAVING
130
IMAGE GENERATION
132
GEOMETRY-PROCESSING
134
INDEX NUMBER SETTING
140
DRAWING
142
TEXTURE MAPPING
144
ALPHA BLENDING
146
HIDDEN-SURFACE REMOVAL
148
MASKING
150
SOUND GENERATION
160
OPERATING
170
STORAGE
172
MAIN STORAGE REGION
174
DRAWING REGION
176
TEXTURE STORAGE
178
LUT STORAGE
179
Z BUFFER
180
INFORMATION STORAGE MEDIUM
190
DISPLAY
192
SOUND OUTPUT
194
SAVED INFORMATION STORAGE DEVICE
196
COMMUNICATION

FIG. 3

INDEX COLOR TEXTURE-MAPPING

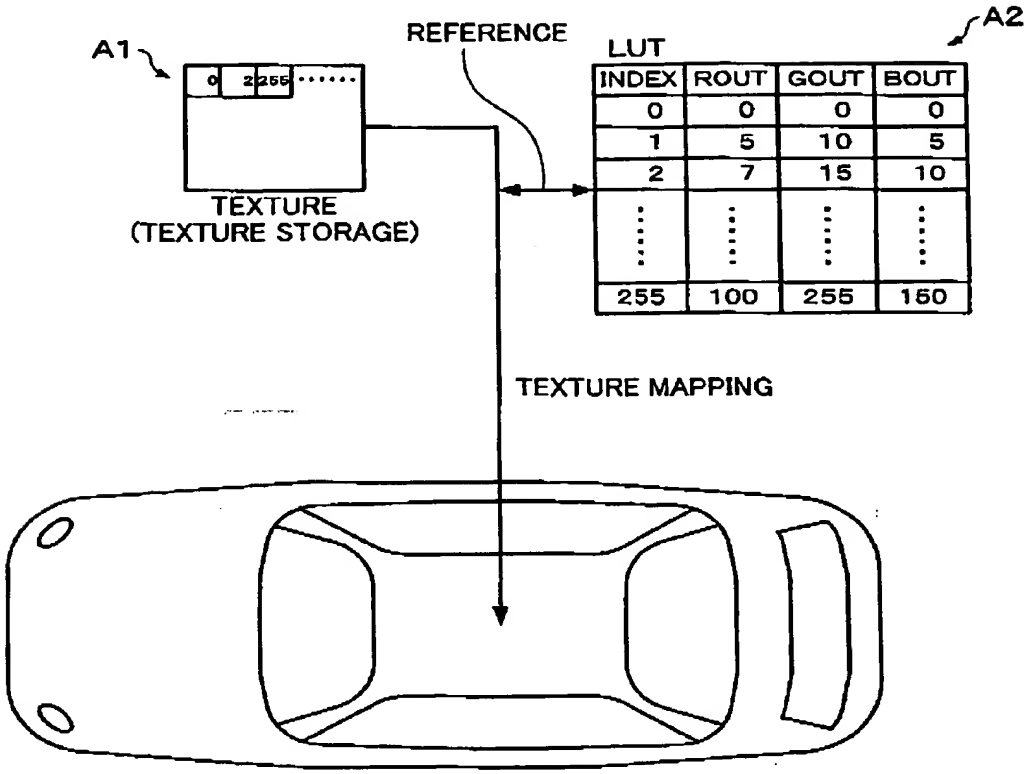


FIG. 4

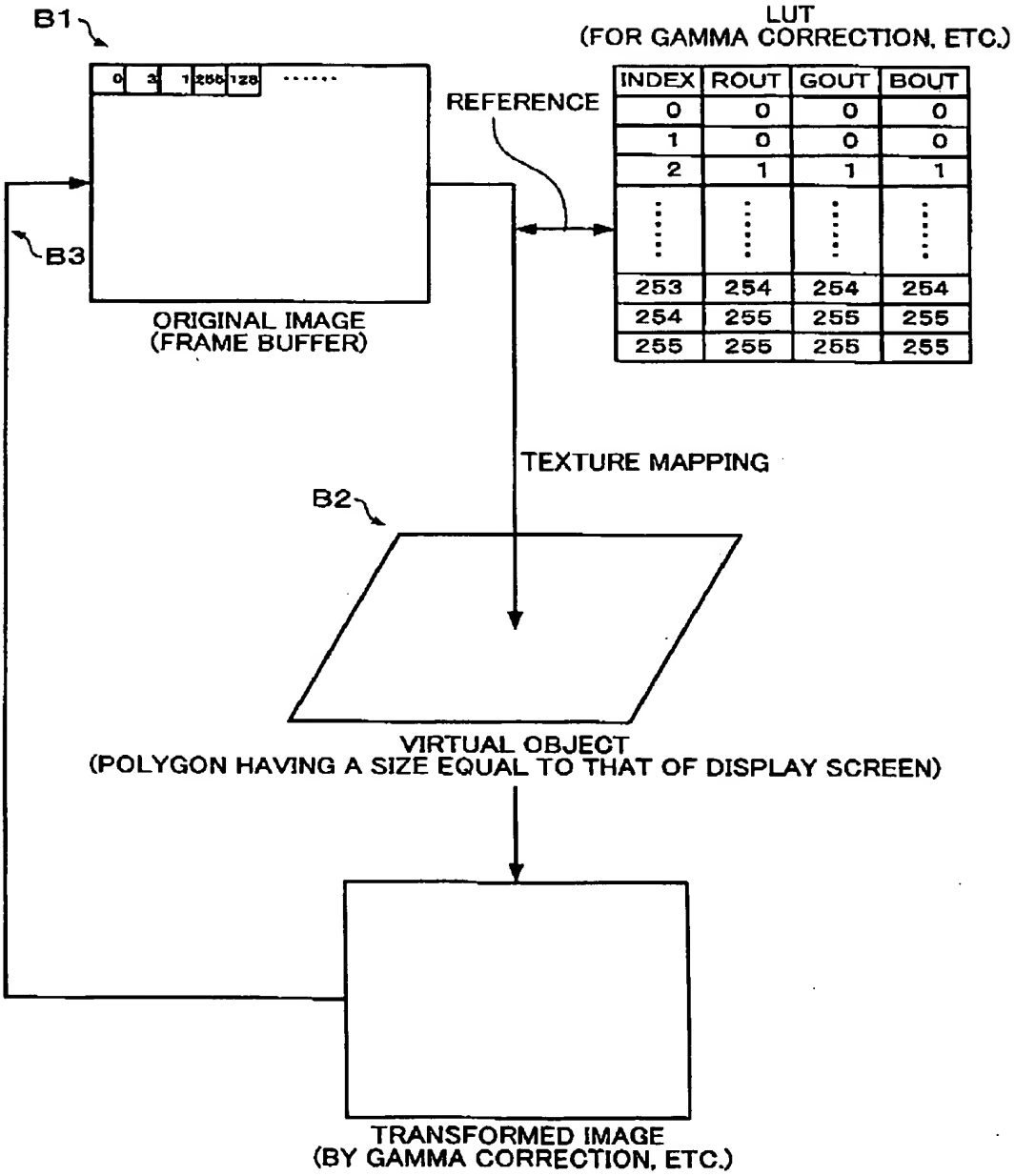

B1
LUT
(FOR GAMMA CORRECTION, ETC.)
REFERENCE
INDEX ROUT GOUT BOUT
0 0 0 0
1 0 0 0
2 1 1 1
253 254 254 254
254 255 255 255
255 255 255 255
B3
ORIGINAL IMAGE
(FRAME BUFFER)
TEXTURE MAPPING
B2
VIRTUAL OBJECT
(POLYGON HAVING A SIZE EQUAL TO THAT OF DISPLAY SCREEN)
TRANSFORMED IMAGE
(BY GAMMA CORRECTION, ETC.)

FIG. 5A

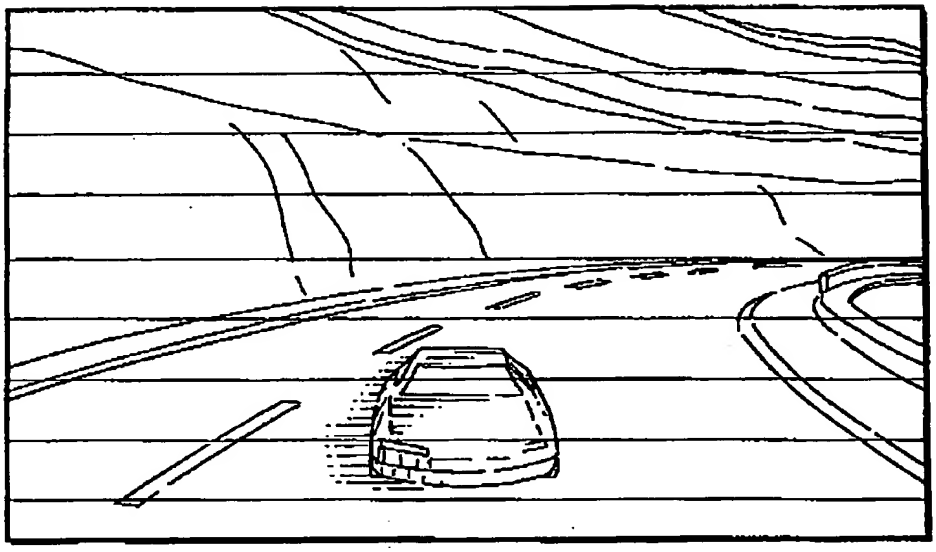
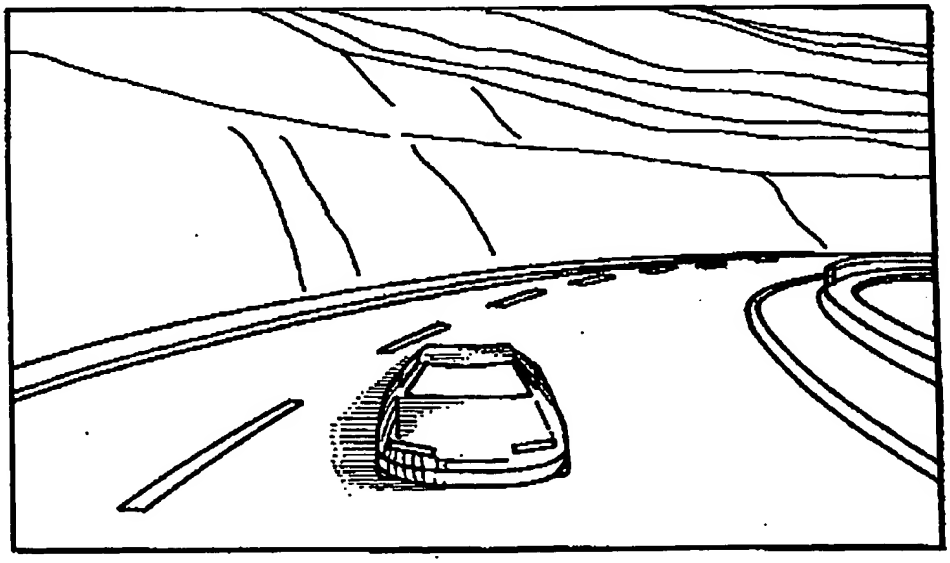


FIG. 5B



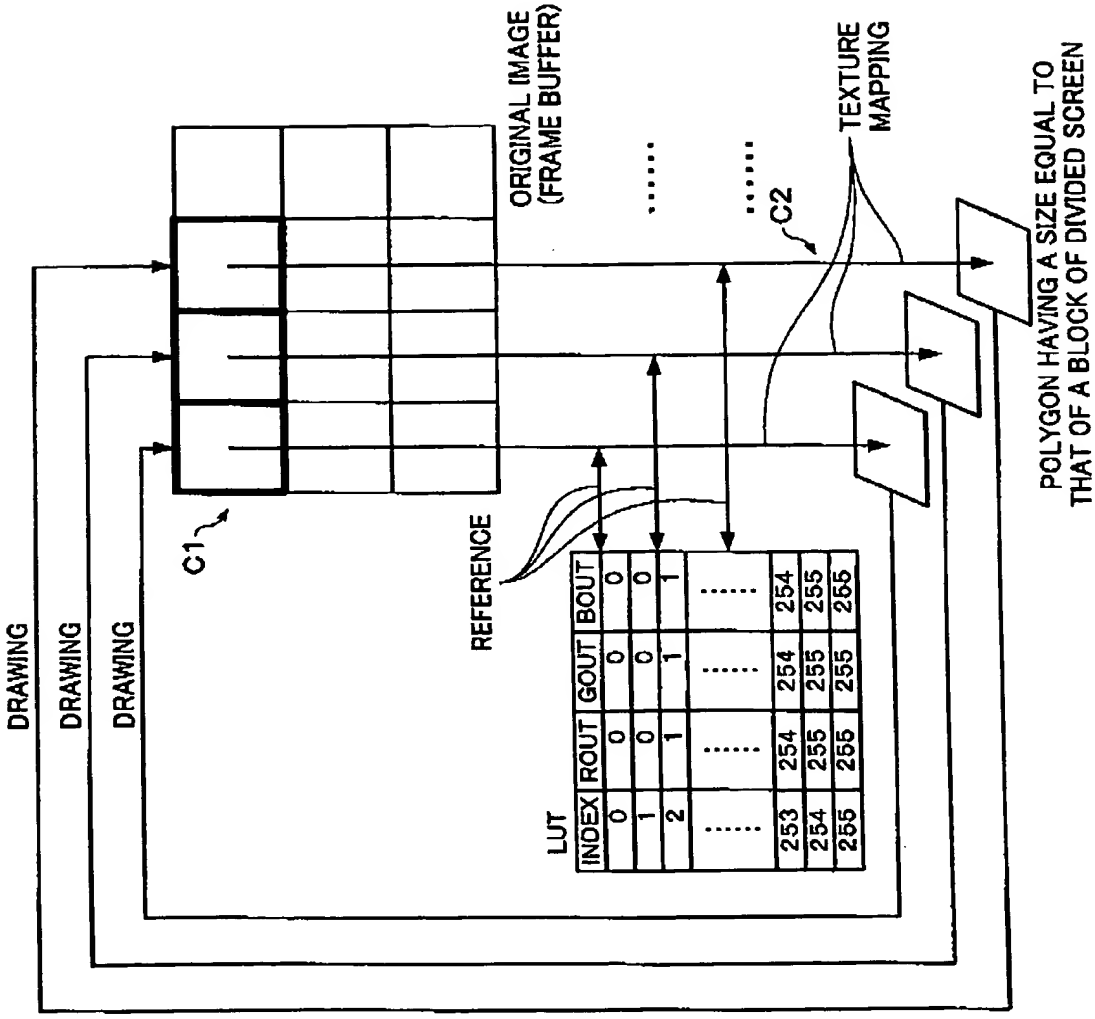

DRAWING
DRAWING
DRAWING
C1
ORIGINAL IMAGE
(FRAME BUFFER)
REFERENCE
LUT
INDEX
ROUT
GOUT
BOUT
C2
TEXTURE
MAPPING
POLYGON HAVING A SIZE EQUAL TO
THAT OF A BLOCK OF DIVIDED SCREEN

FIG. 6

FIG. 7A

GAMMA CORRECTION

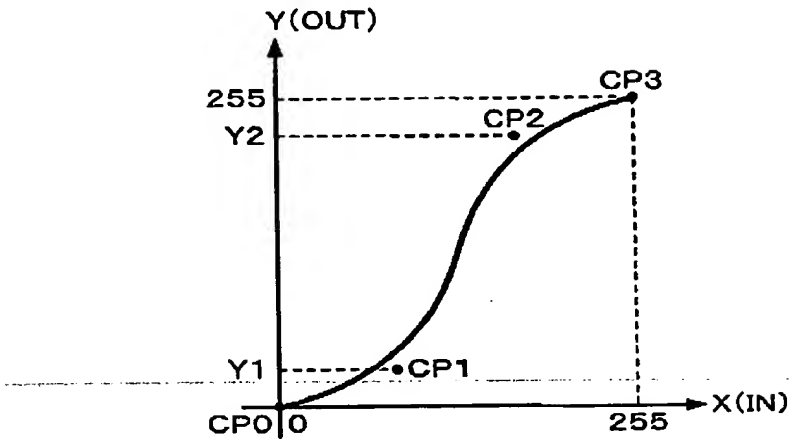


FIG. 7B

LUT FOR GAMMA CORRECTION

INDEX	ROUT	GOUT	BOUT
0	0	0	0
1	0	0	0
2	1	1	1
3	1	1	1
4	2	2	2
5	3	3	3
⋮	⋮	⋮	⋮
250	252	252	252
251	253	253	253
252	254	254	254
253	254	254	254
254	255	255	255
255	255	255	255

FIG. 8A

NEGATIVE/POSITIVE INVERSION

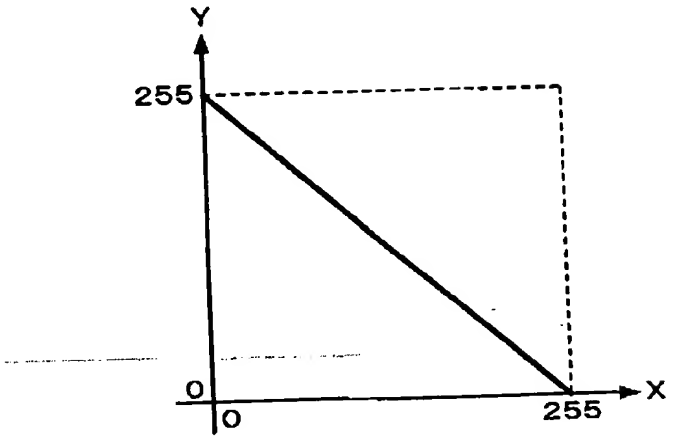


FIG. 8B

LUT FOR NEGATIVE/POSITIVE INVERSION

INDEX	ROUT	GOUT	BOUT
0	255	255	255
1	254	254	254
2	253	253	253
3	252	252	252
⋮	⋮	⋮	⋮
253	2	2	2
254	1	1	1
255	0	0	0

FIG. 9A POSTERIZATION

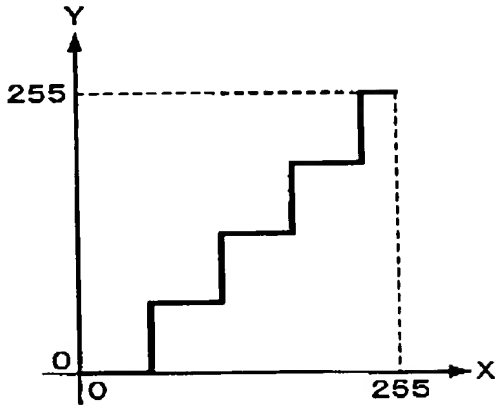


FIG. 9B SOLARIZATION

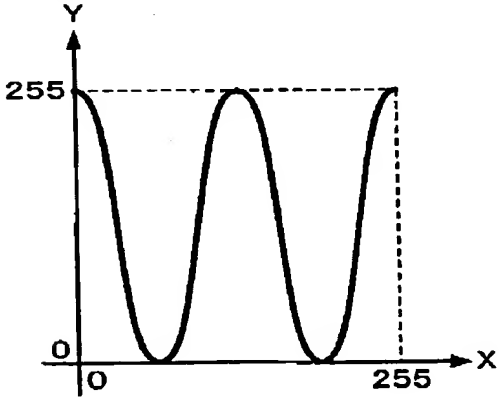


FIG. 9C BINARIZATION

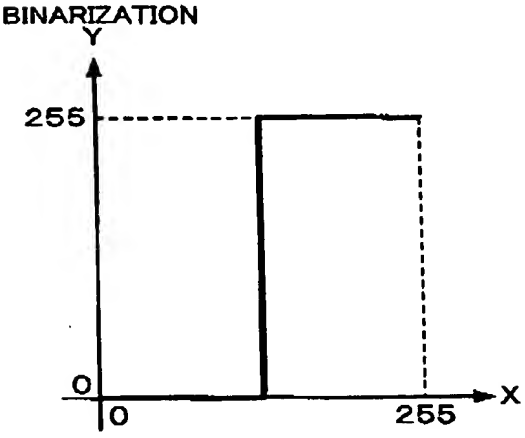


FIG. 10A

LUTR FOR MONOTONE FILTERING

INDEX	ROUTR	GOUTR	BOUTR
0	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	1	1	1
5	1	1	1
⋮	⋮	⋮	⋮
250	74	74	74
251	75	75	75
252	75	75	75
253	75	75	75
254	75	75	75
255	76	76	76

FIG. 10B

LUTG FOR MONOTONE FILTERING

INDEX	ROUTG	GOUTG	BOUTG
0	0	0	0
1	0	0	0
2	1	1	1
3	1	1	1
4	2	2	2
5	2	2	2
⋮	⋮	⋮	⋮
250	146	146	146
251	147	147	147
252	147	147	147
253	148	148	148
254	148	148	148
255	149	149	149

FIG. 11

LUTB FOR MONOTONE FILTERING

INDEX	ROUTB	GOUTB	BOUTB
0	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
⋮	⋮	⋮	⋮
250	28	28	28
251	28	28	28
252	28	28	28
253	28	28	28
254	29	29	29
255	29	29	29

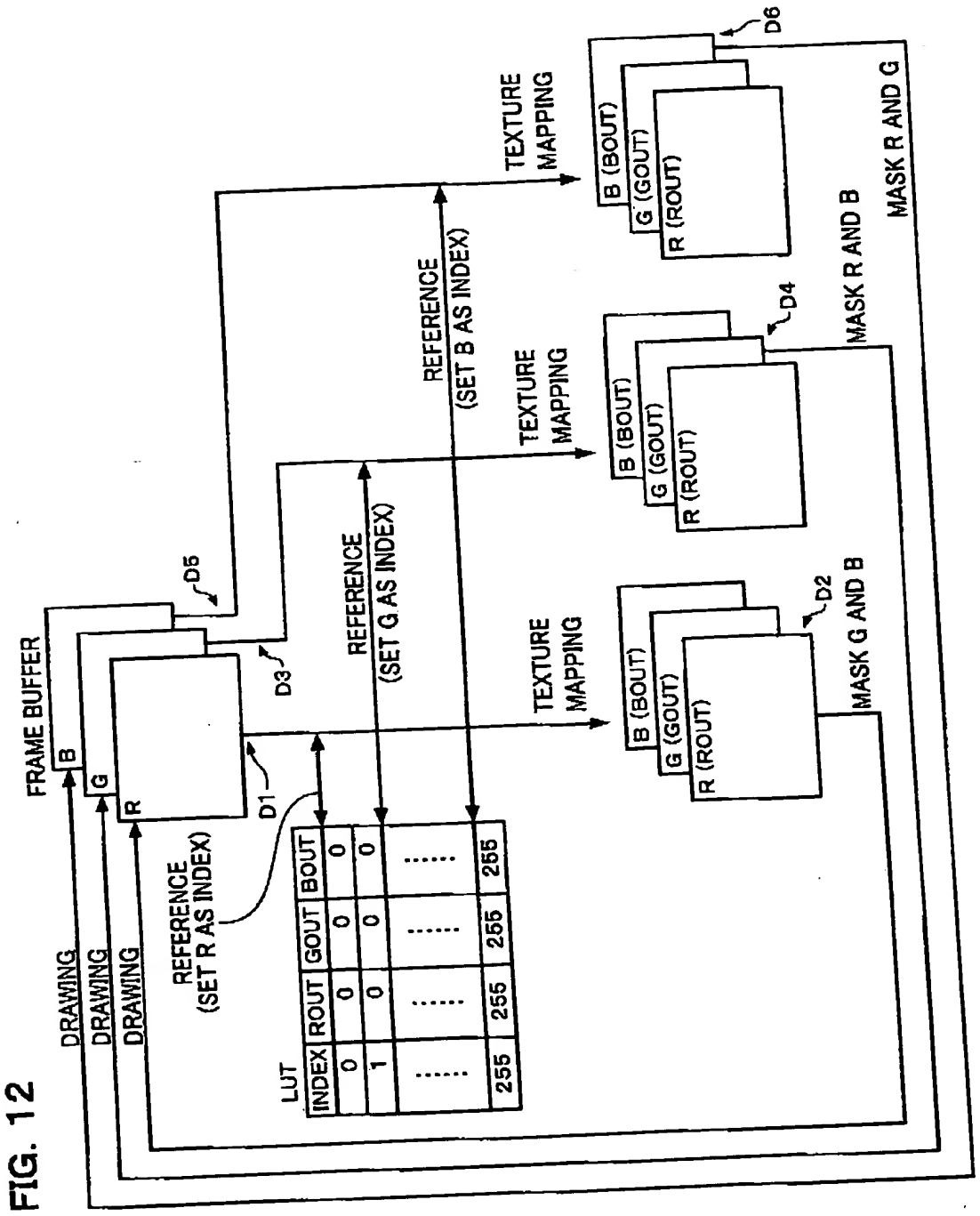

FRAME BUFFER
B
G
R
DRAWING
DRAWING
DRAWING
REFERENCE (SET R AS INDEX)
LUT
INDEX ROUT GOUT BOUT
0 0 0 0
1 0 0 0
255 255 255 255
D1
D2
D3
D4
D5
D6
REFERENCE (SET G AS INDEX)
REFERENCE (SET B AS INDEX)
TEXTURE MAPPING
TEXTURE MAPPING
TEXTURE MAPPING
B (BOUT)
G (GOUT)
R (ROUT)
MASK G AND B
MASK R AND B
MASK R AND G

FIG. 12

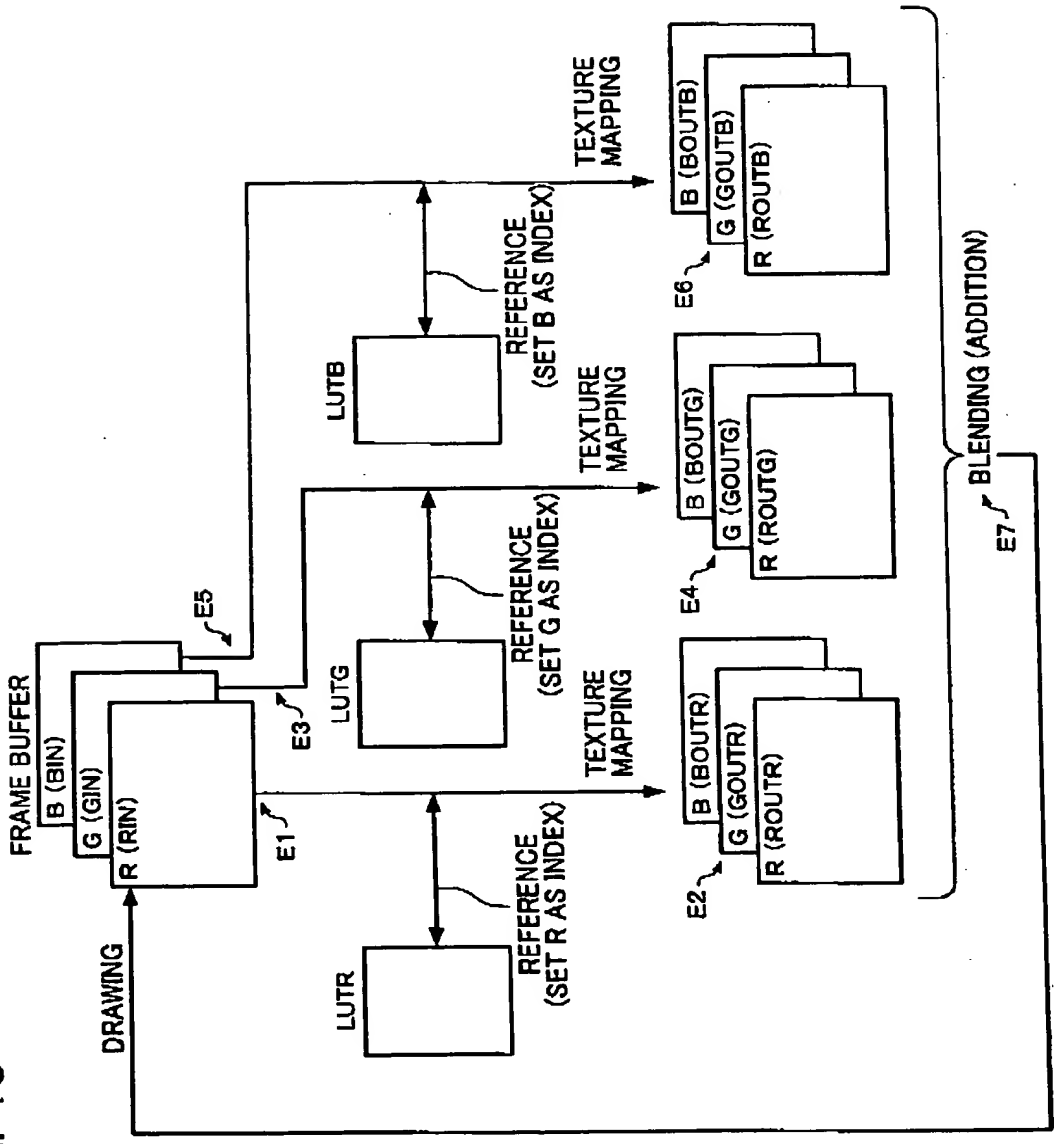
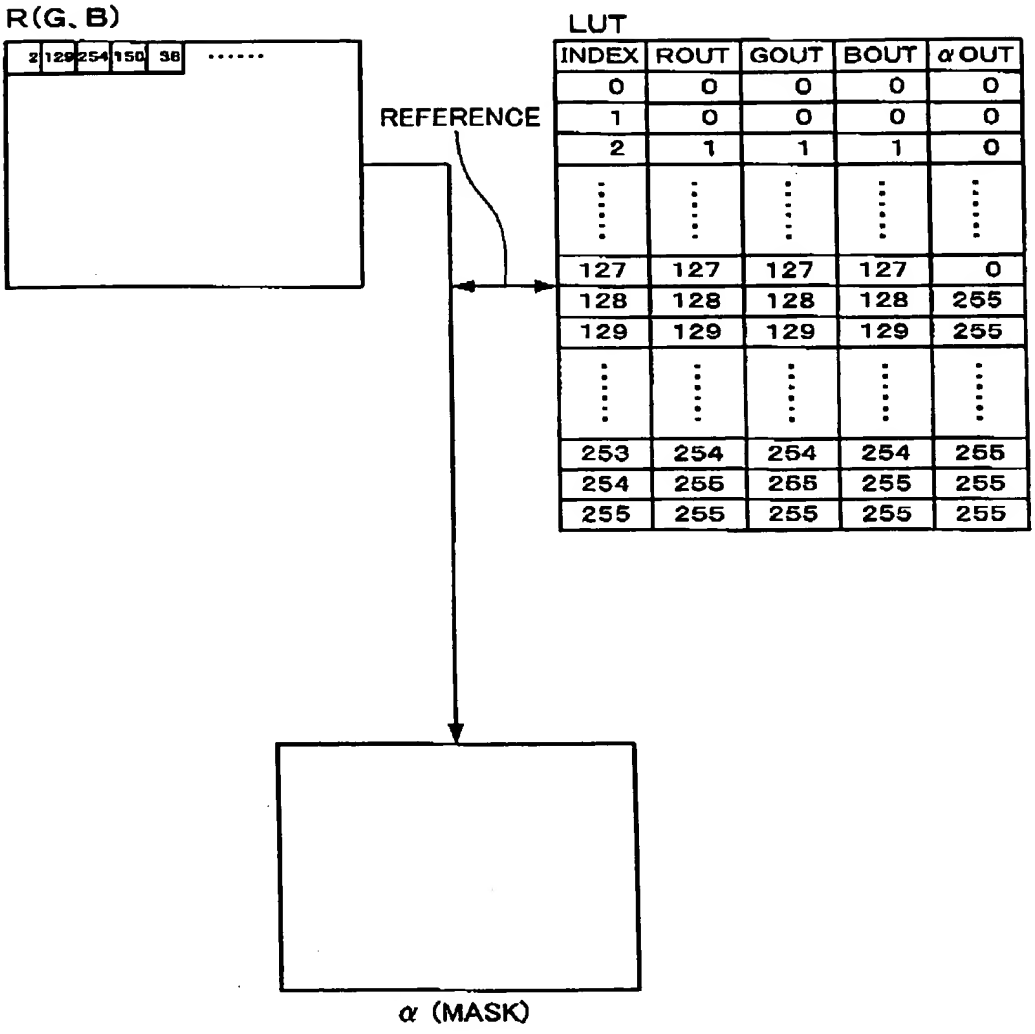

FRAME BUFFER
B (BIN)
G (GIN)
R (RIN)
DRAWING
E1
E2
E3
E4
E5
E6
E7
LUTR
LUTG
LUTB
REFERENCE (SET R AS INDEX)
REFERENCE (SET G AS INDEX)
REFERENCE (SET B AS INDEX)
TEXTURE MAPPING
TEXTURE MAPPING
TEXTURE MAPPING
B (BOUTR)
G (GOUTR)
R (ROUTR)
B (BOUTG)
G (GOUTG)
R (ROUTG)
B (BOUTB)
G (GOUTB)
R (ROUTB)
BLENDING (ADDITION)

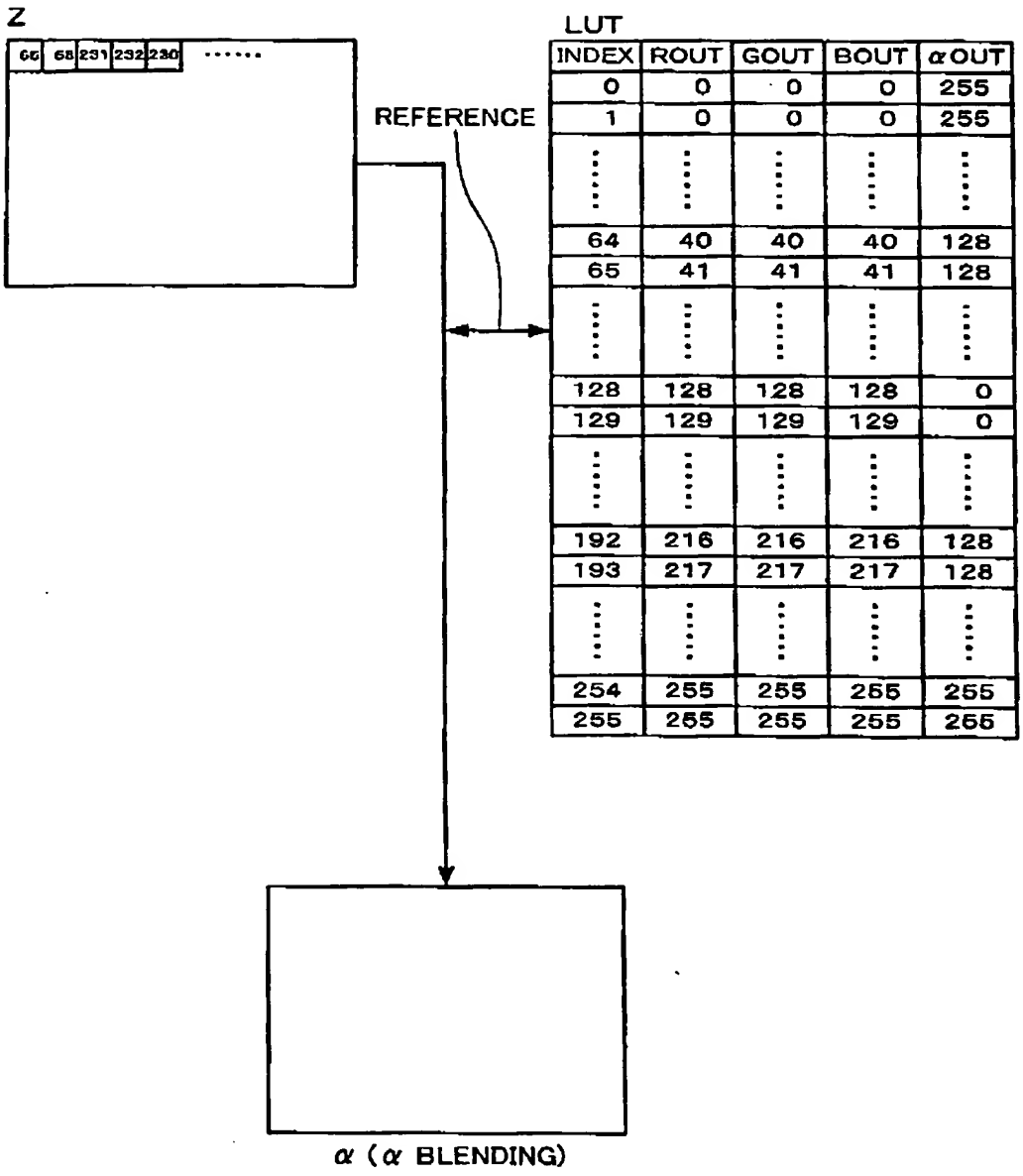
FIG. 13

FIG. 14



INDEX	ROUT	GOUT	BOUT	αOUT
0	0	0	0	0
1	0	0	0	0
2	1	1	1	0
⋮	⋮	⋮	⋮	⋮
127	127	127	127	0
128	128	128	128	255
129	129	129	129	255
⋮	⋮	⋮	⋮	⋮
253	254	254	254	255
254	255	255	255	255
255	255	255	255	255

FIG. 15



INDEX	ROUT	GOUT	BOUT	αOUT
0	0	0	0	255
1	0	0	0	255
⋮	⋮	⋮	⋮	⋮
64	40	40	40	128
65	41	41	41	128
⋮	⋮	⋮	⋮	⋮
128	128	128	128	0
129	129	129	129	0
⋮	⋮	⋮	⋮	⋮
192	216	216	216	128
193	217	217	217	128
⋮	⋮	⋮	⋮	⋮
254	255	255	255	255
255	255	255	255	255

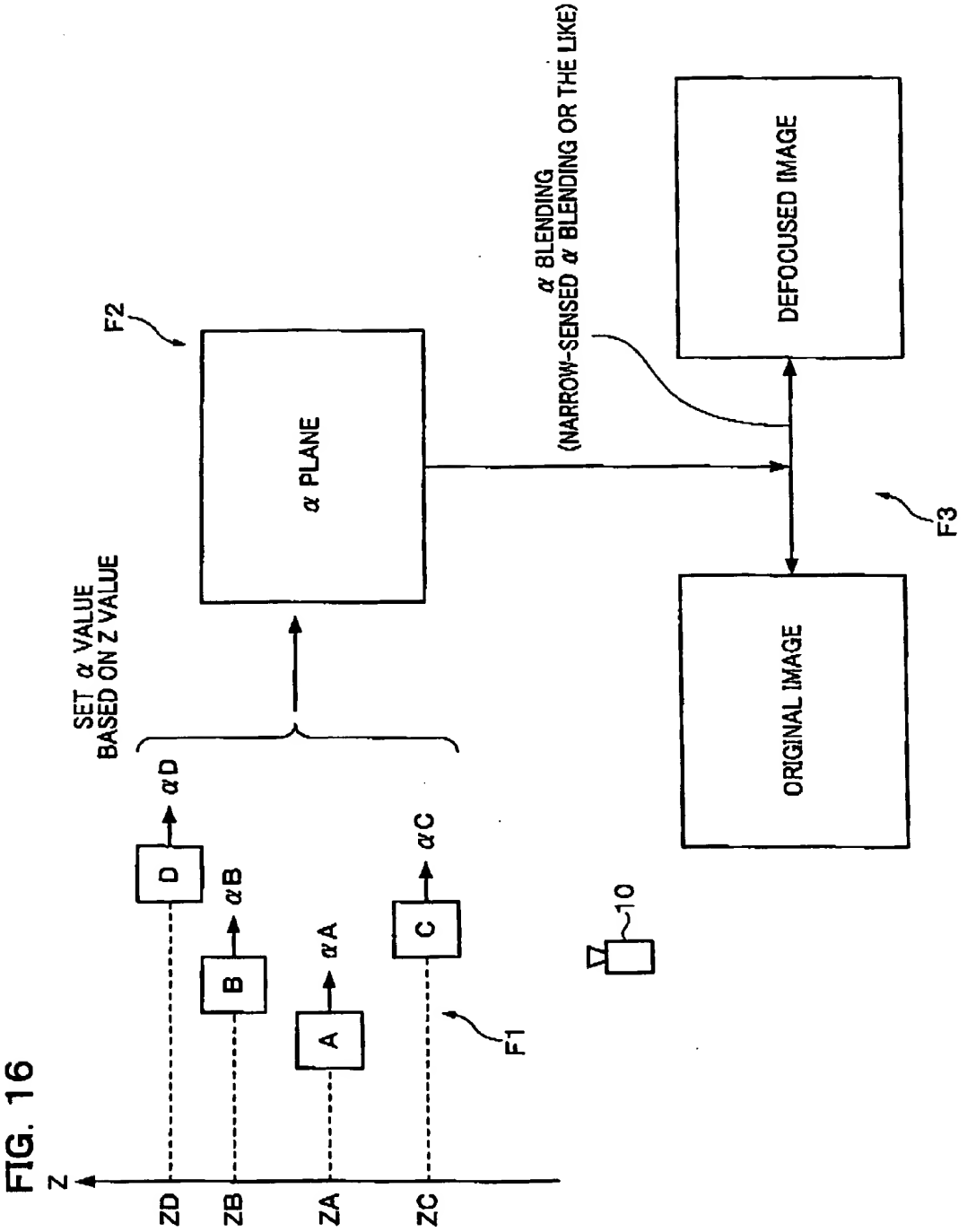

Z
ZD
ZB
ZA
ZC
D
B
A
C
αD
αB
αA
αC
F1
10
SET α VALUE BASED ON Z VALUE
F2
α PLANE
α BLENDING (NARROW-SENSED α BLENDING OR THE LIKE)
DEFOCUSED IMAGE
ORIGINAL IMAGE
F3

FIG. 16

FIG. 17A ORIGINAL IMAGE

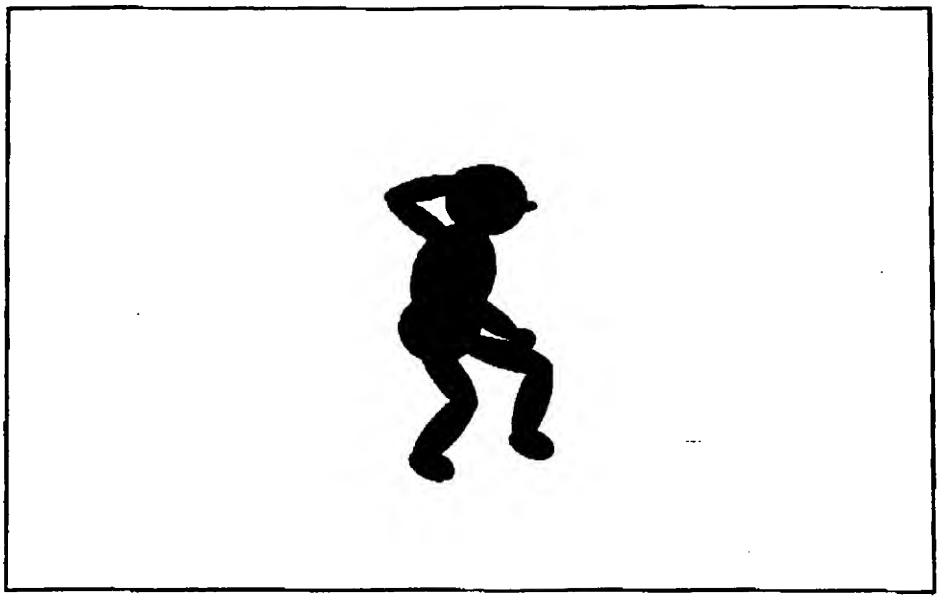


FIG. 17B DEFOCUSED IMAGE

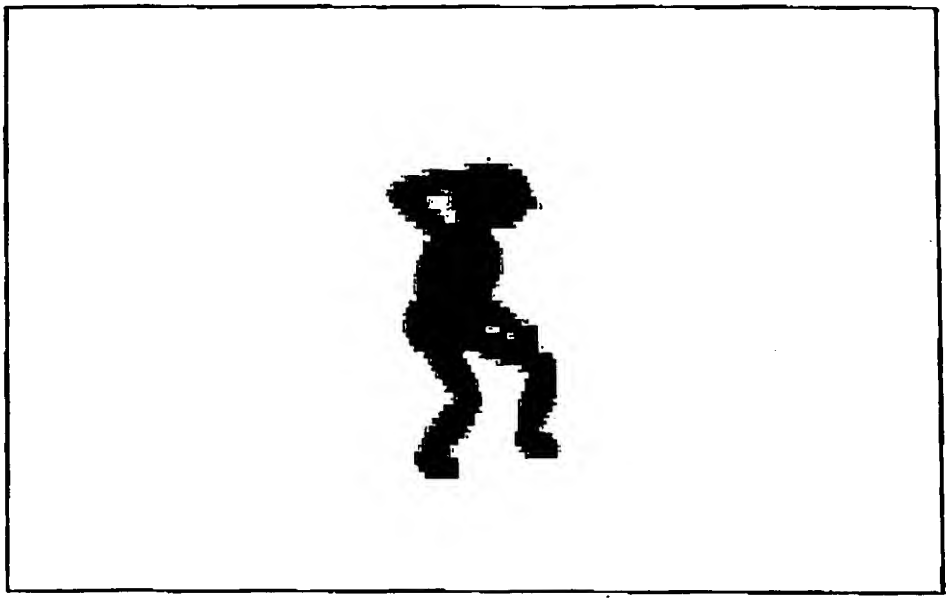
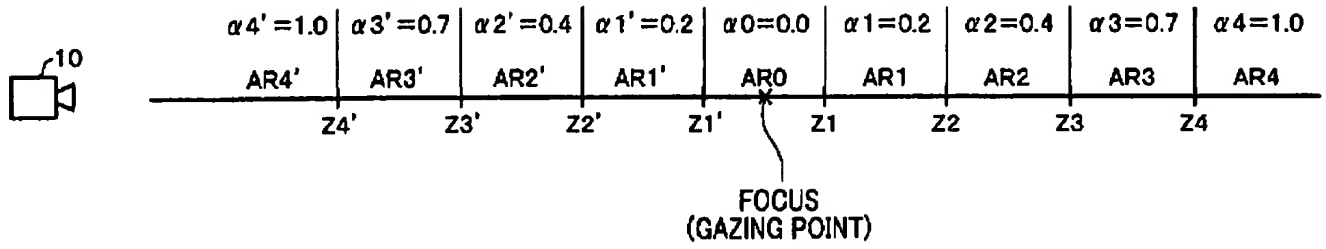


FIG. 18



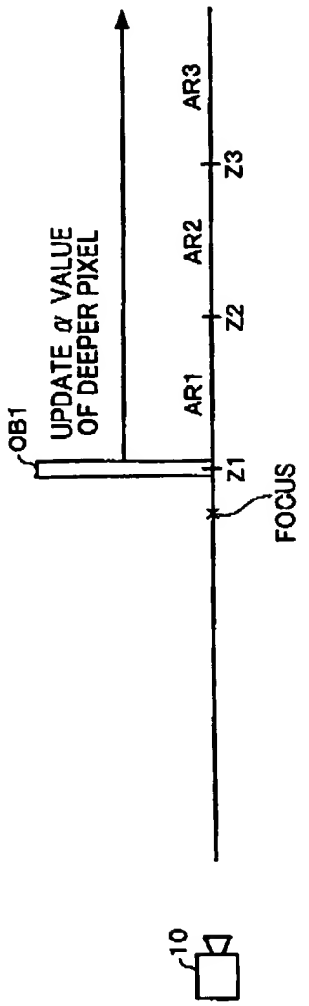


FIG. 19A

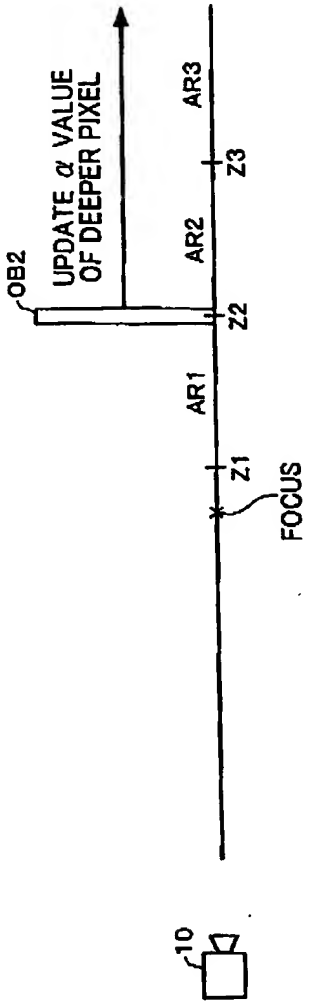


FIG. 19B

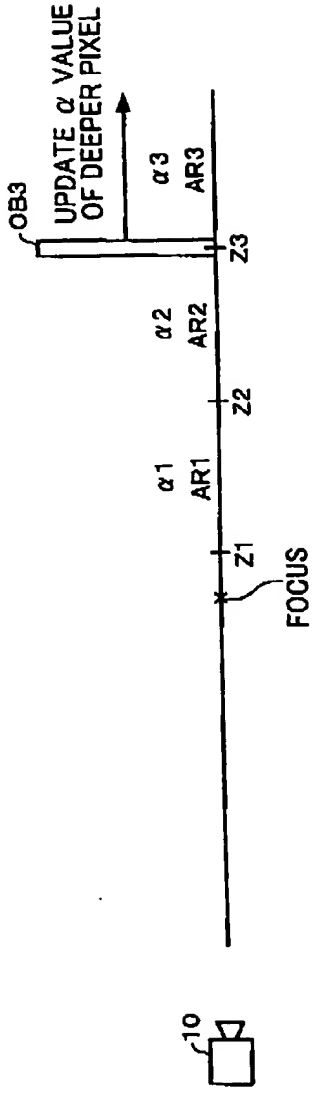
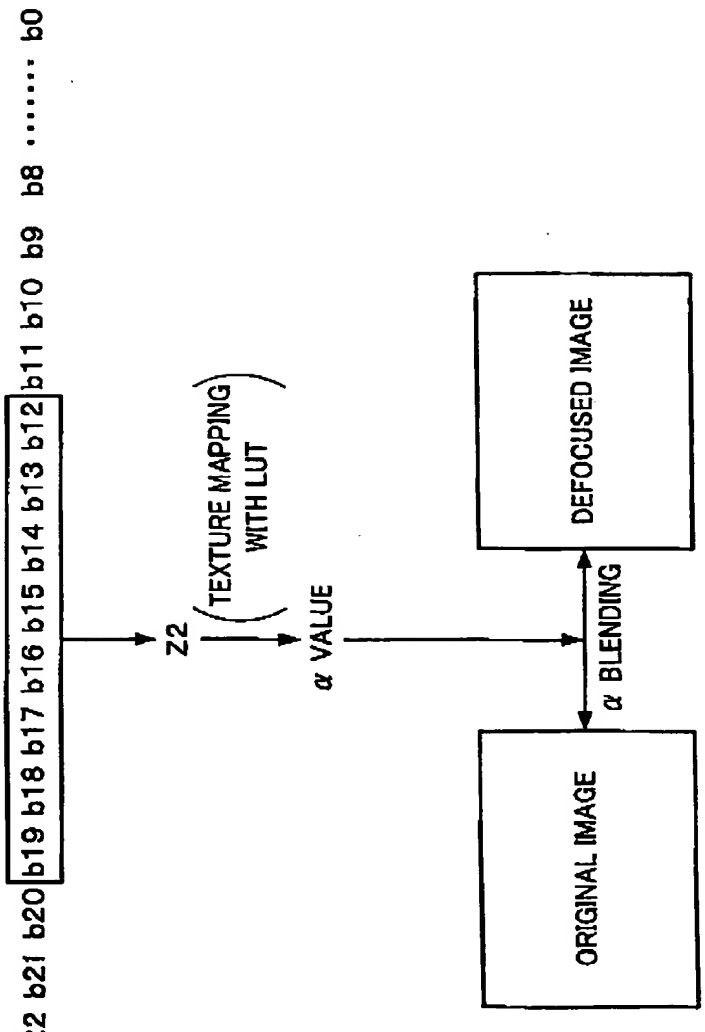


FIG. 19C

FIG. 20



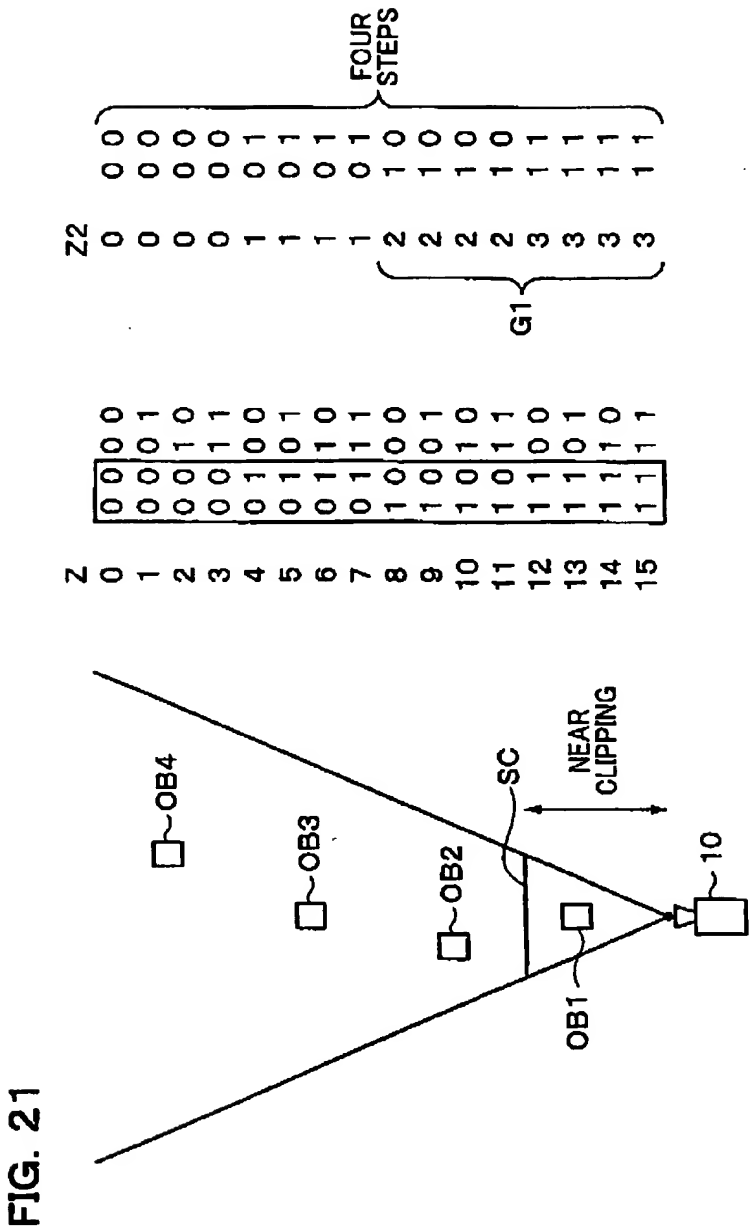
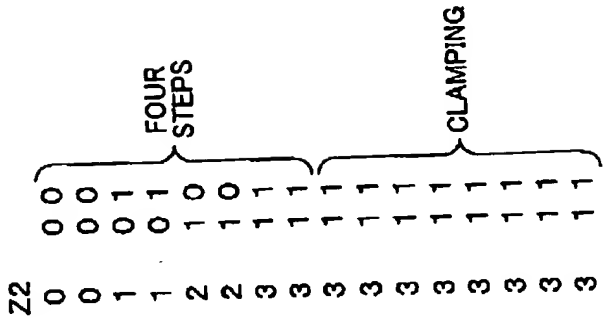
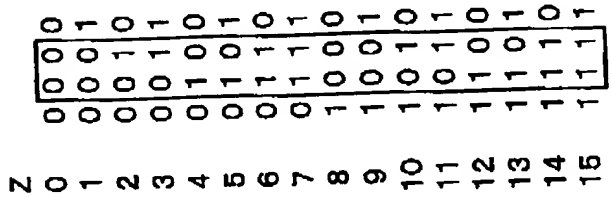


FIG. 21





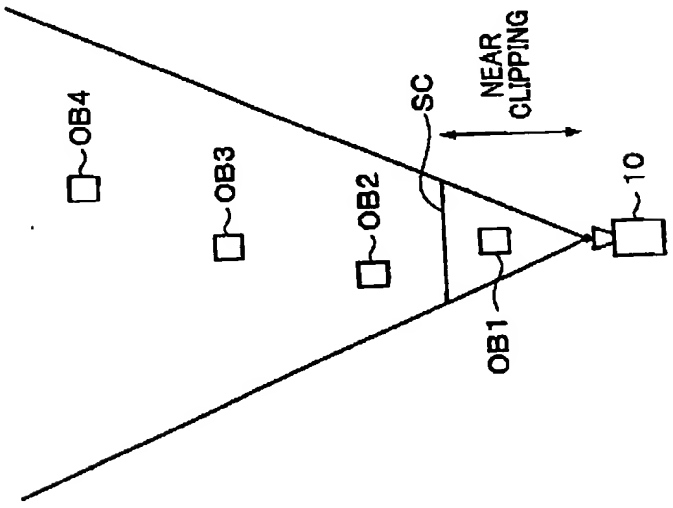


FIG. 22

FIG. 23

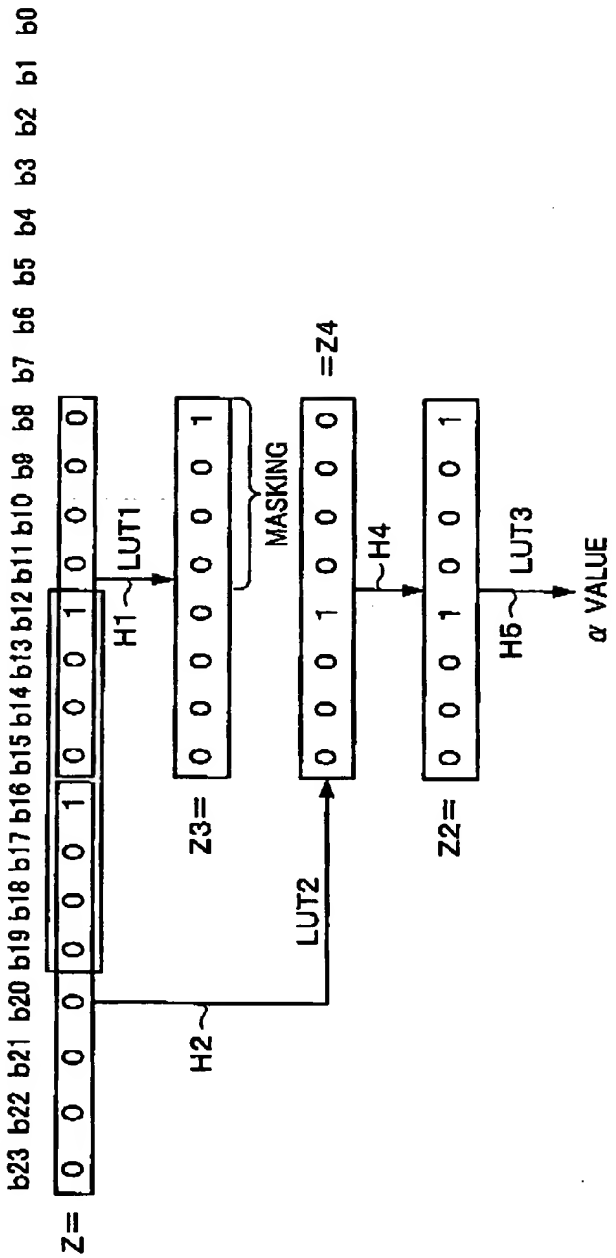


FIG. 24

LUT1 (BITS 15 TO 8)

INDEX	OUT (ANY ONE OF R, G, B AND α)
0x00 (00000000)	0x00 (00000000)
⋮	⋮
0x0F (00001111)	0x00 (00000000)
0x10 (00010000)	0x01 (00000001)
⋮	⋮
0x1F (00011111)	0x01 (00000001)
0x20 (00100000)	0x02 (00000010)
⋮	⋮
0x2F (00101111)	0x02 (00000010)
0x30 (00110000)	0x03 (00000011)
⋮	⋮
0xE0 (11100000)	0x0E (00001110)
⋮	⋮
0xEF (11101111)	0x0E (00001110)
0xF0 (11110000)	0x0F (00001111)
0xF1 (11110001)	0x0F (00001111)
0xF2 (11110010)	0x0F (00001111)
⋮	⋮
0xFF (11111111)	0x0F (00001111)

FIG. 25

LUT2 (BITS 23 TO 16)

INDEX	OUT (ANY ONE OF R, G, B AND α)
0x00 (00000000)	0x00 (00000000)
0x01 (00000001)	0x10 (00010000)
0x02 (00000010)	0x20 (00100000)
0x03 (00000011)	0x30 (00110000)
0x04 (00000100)	0x40 (01000000)
⋮	⋮
0x0E (00001110)	0xE0 (11100000)
0x0F (00001111)	0xF0 (11110000)
0x10 (00010000)	0xF0 (11110000)
0x11 (00010001)	0xF0 (11110000)
⋮	⋮
0xFF (11111111)	0xF0 (11110000)

Q1

CLAMPING

FIG. 26A

LUT3

INDEX	OUT(α)
0x00 (00000000)	0xFF (11111111)
0x01 (00000001)	0xFE (11111110)
0x02 (00000010)	0xFB (11111011)
⋮	⋮
0x7F (01111111)	0x00 (00000000)
0x80 (10000000)	0x00 (00000000)
0x81 (10000001)	0x00 (00000000)
⋮	⋮
0xFE (11111110)	0xFE (11111110)
0xFF (11111111)	0xFF (11111111)

FIG. 26B

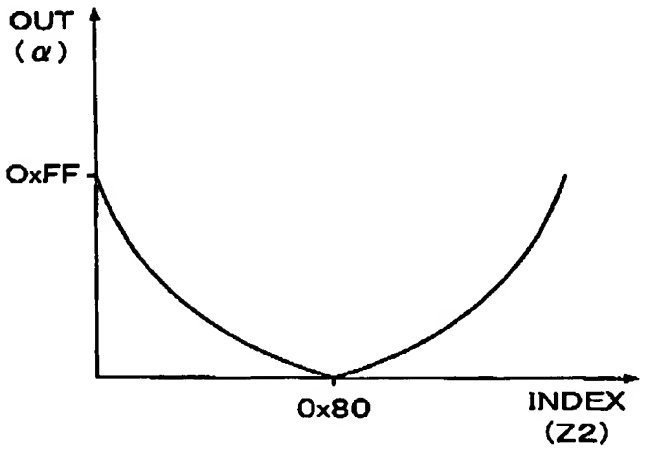


FIG. 27

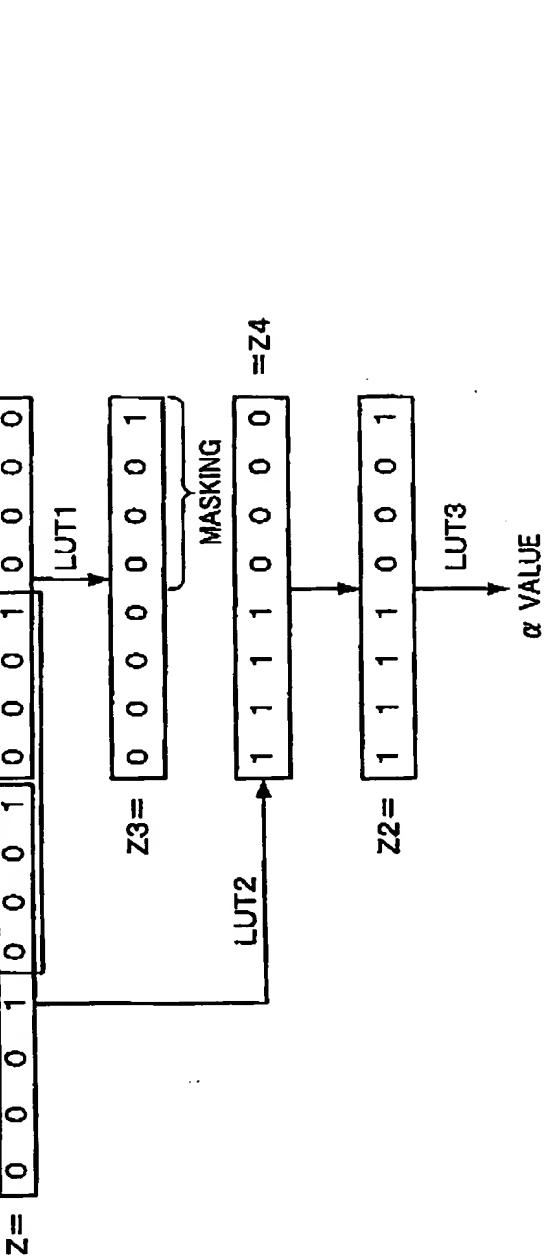

K
I
L M
J
N
b23 b22 b21 b20 b19 b18 b17 b16 b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0
Z=
0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0
LUT1
Z3=
0 0 0 0 0 0 0 0 0 0 0 1
MASKING
LUT2
=Z4
1 1 1 1 1 0 0 0 0 0 0 0
Z2=
1 1 1 1 1 0 0 0 0 0 0 1
LUT3
α VALUE

FIG. 28

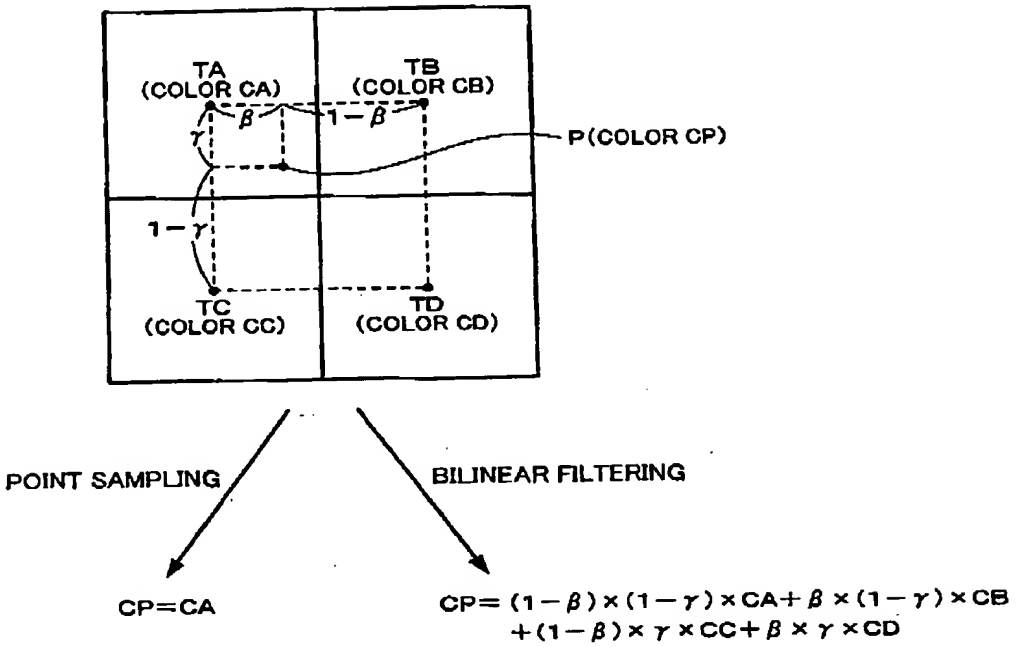
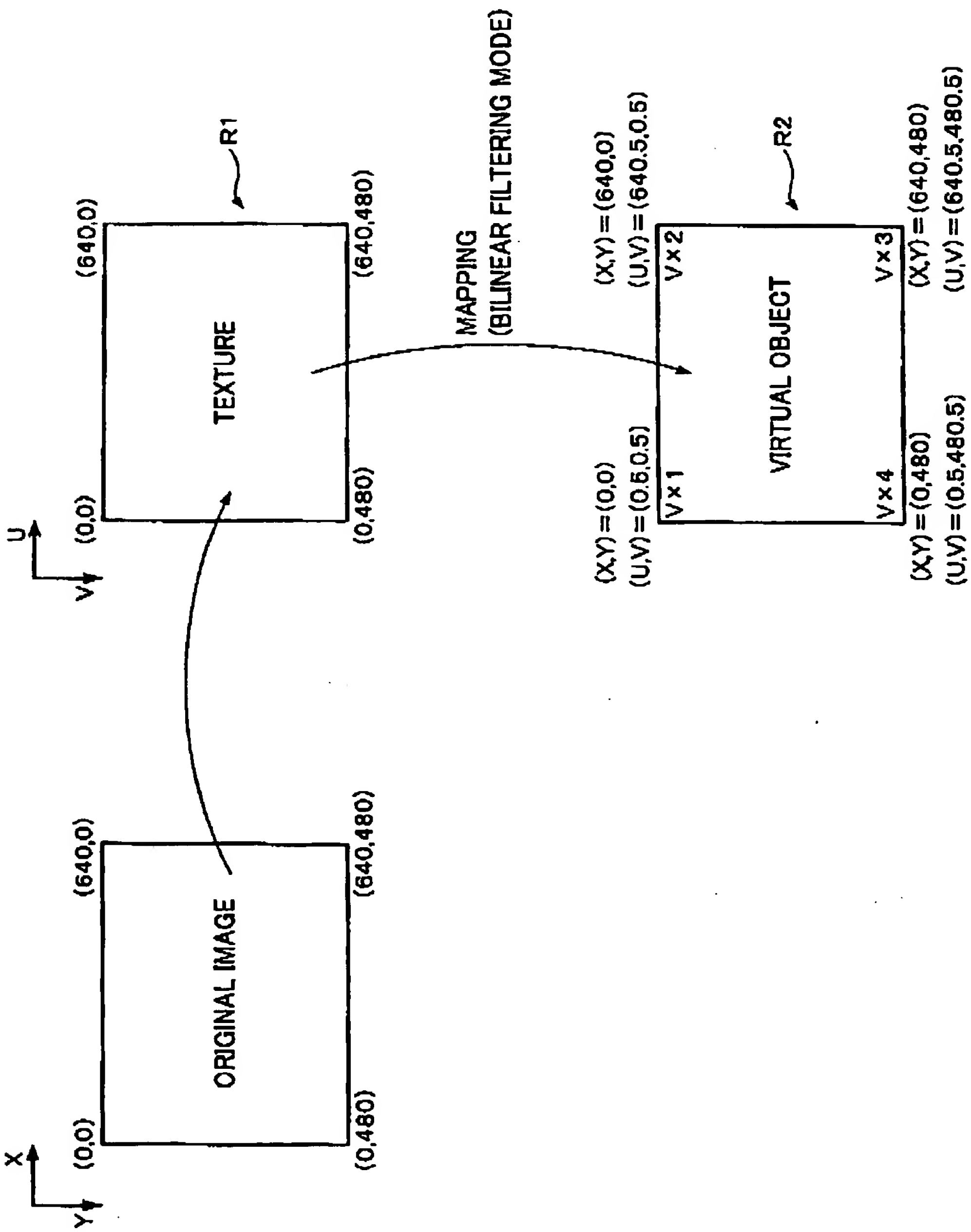

TA
(COLOR CA)
TB
(COLOR CB)
β
1−β
γ
P(COLOR CP)
1−γ
TC
(COLOR CC)
TD
(COLOR CD)
POINT SAMPLING
BILINEAR FILTERING
CP=CA
CP= (1−β)×(1−γ)×CA+β×(1−γ)×CB
+(1−β)×γ×CC+β×γ×CD

FIG. 29


X
Y
(0,0)
(640,0)
(0,480)
(640,480)
ORIGINAL IMAGE
U
V
(0,0)
(640,0)
(0,480)
(640,480)
TEXTURE
R1
MAPPING
(BILINEAR FILTERING MODE)
VIRTUAL OBJECT
R2
Vx1
Vx2
Vx3
Vx4
(X,Y)=(0,0)
(U,V)=(0.5,0.5)
(X,Y)=(640,0)
(U,V)=(640.5,0.5)
(X,Y)=(640,480)
(U,V)=(640.5,480.5)
(X,Y)=(0,480)
(U,V)=(0.5,480.5)

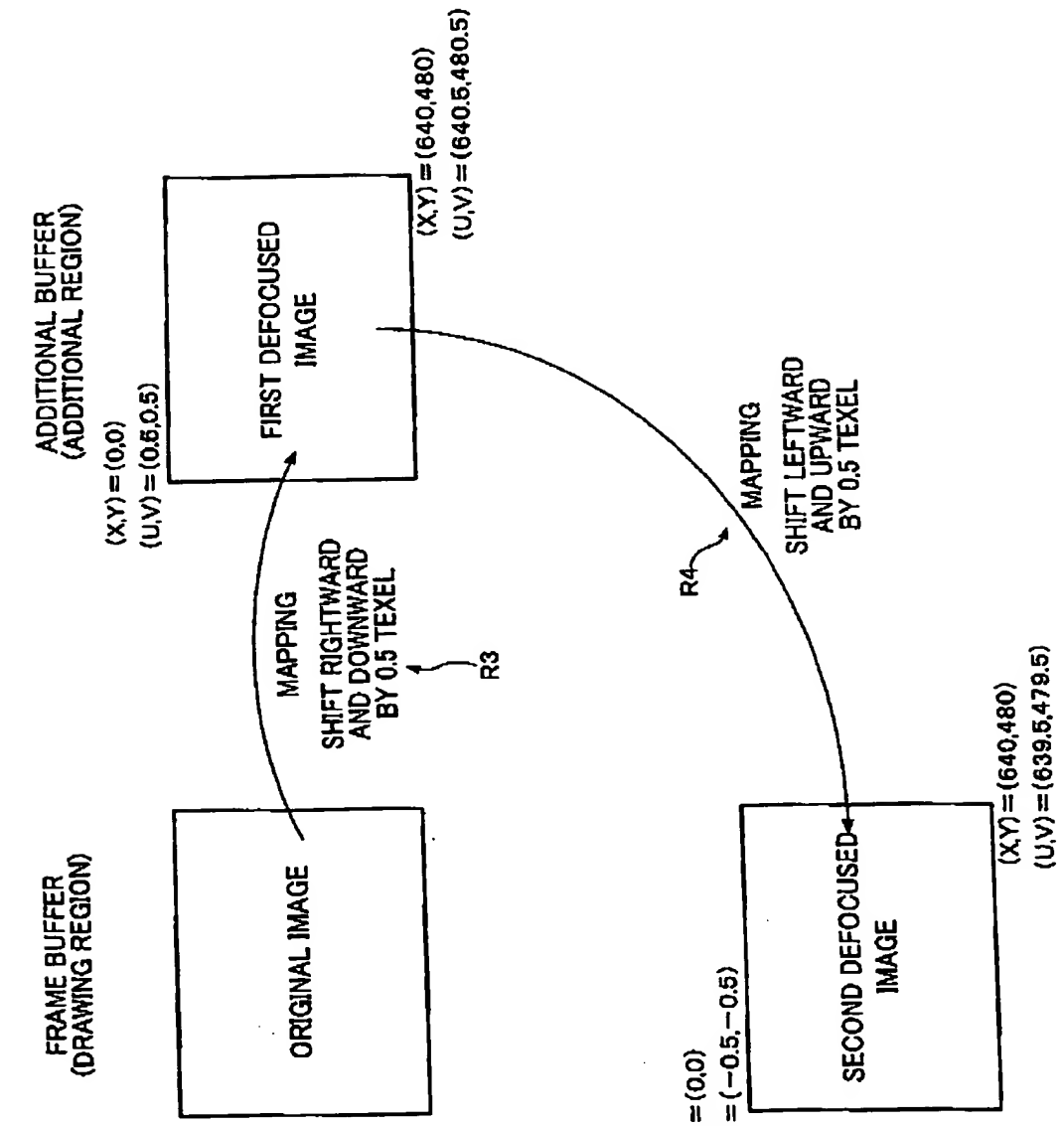


FIG. 30

FIG. 31A

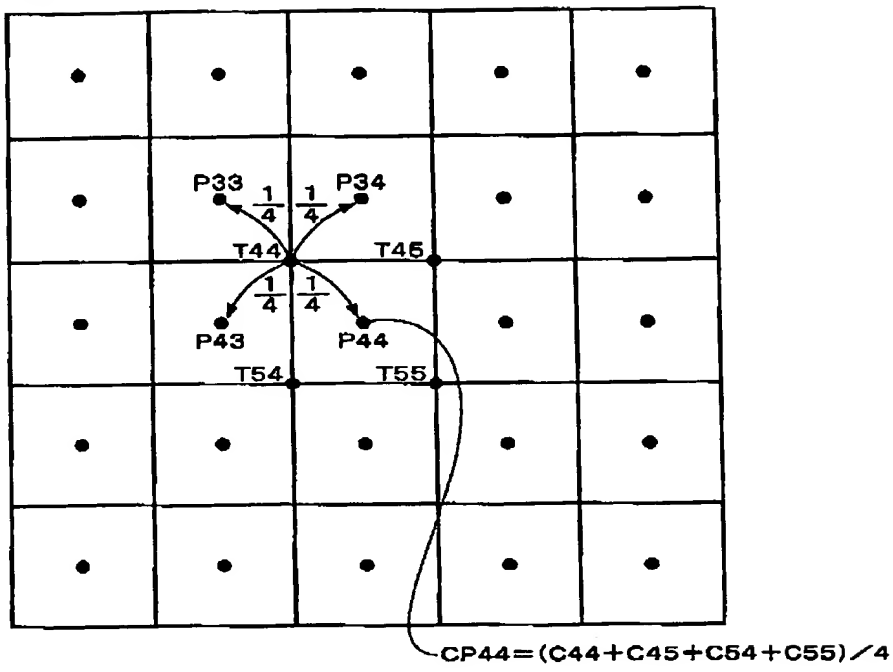


FIG. 31B

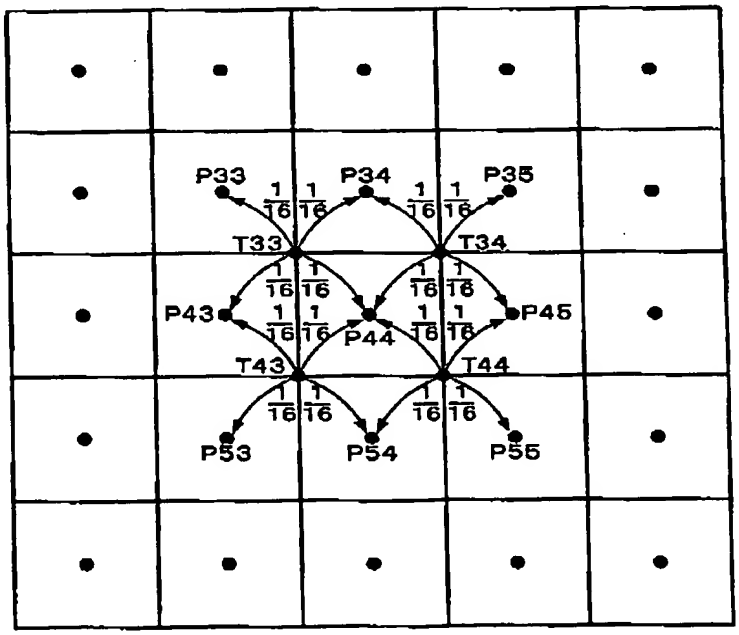


FIG. 32A

	$\frac{1}{16}$	$\frac{2}{16}$	$\frac{1}{16}$	
	$\frac{2}{16}$	$\frac{4}{16}$	$\frac{2}{16}$	
	$\frac{1}{16}$	$\frac{2}{16}$	$\frac{1}{16}$	

FIG. 32B

$\frac{1}{256}$	$\frac{4}{256}$	$\frac{6}{256}$	$\frac{4}{256}$	$\frac{1}{256}$
$\frac{4}{256}$	$\frac{16}{256}$	$\frac{24}{256}$	$\frac{16}{256}$	$\frac{4}{256}$
$\frac{6}{256}$	$\frac{24}{256}$	$\frac{36}{256}$	$\frac{24}{256}$	$\frac{6}{256}$
$\frac{4}{256}$	$\frac{16}{256}$	$\frac{24}{256}$	$\frac{16}{256}$	$\frac{4}{256}$
$\frac{1}{256}$	$\frac{4}{256}$	$\frac{6}{256}$	$\frac{4}{256}$	$\frac{1}{256}$

FIG. 33

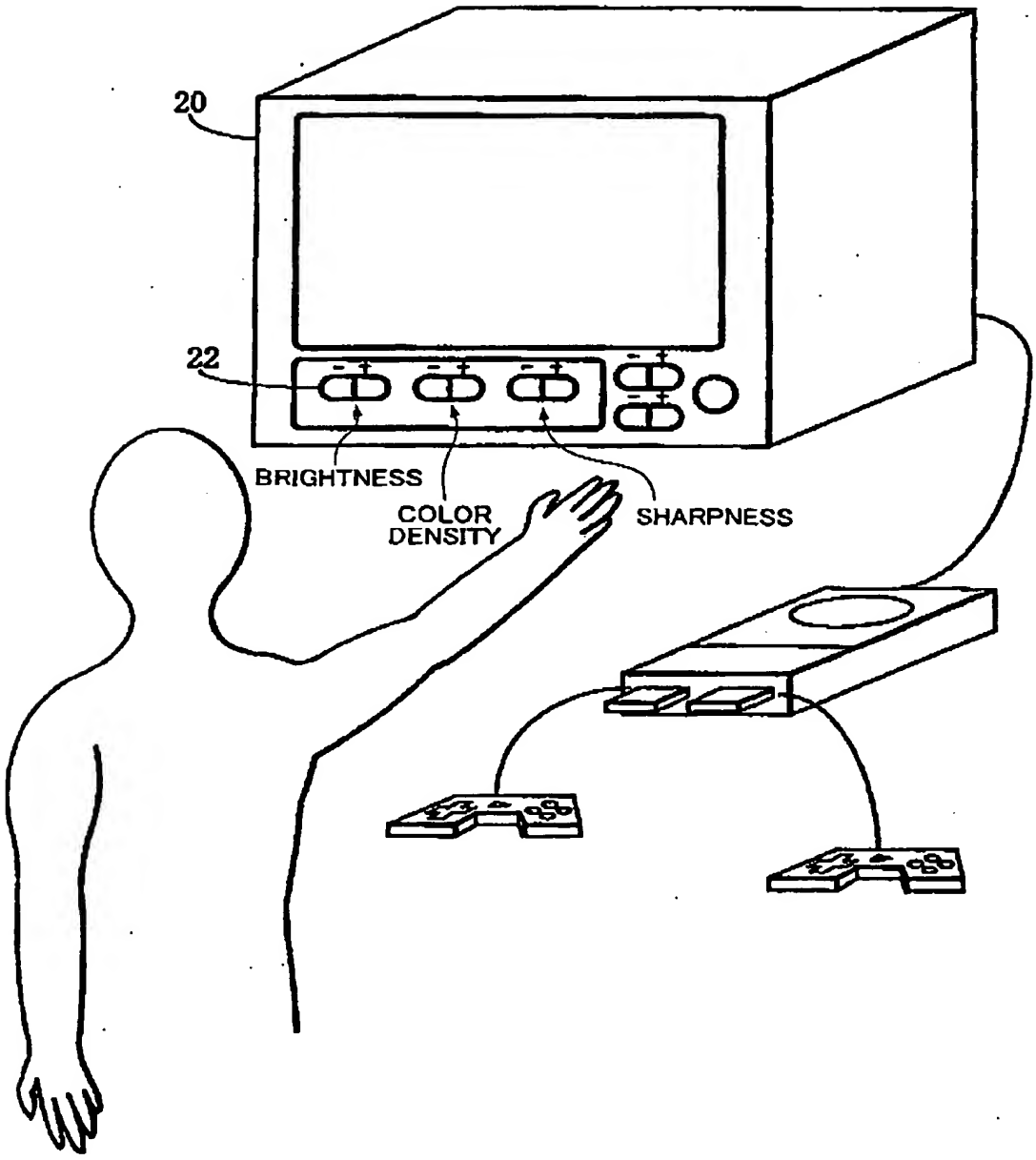


FIG. 34

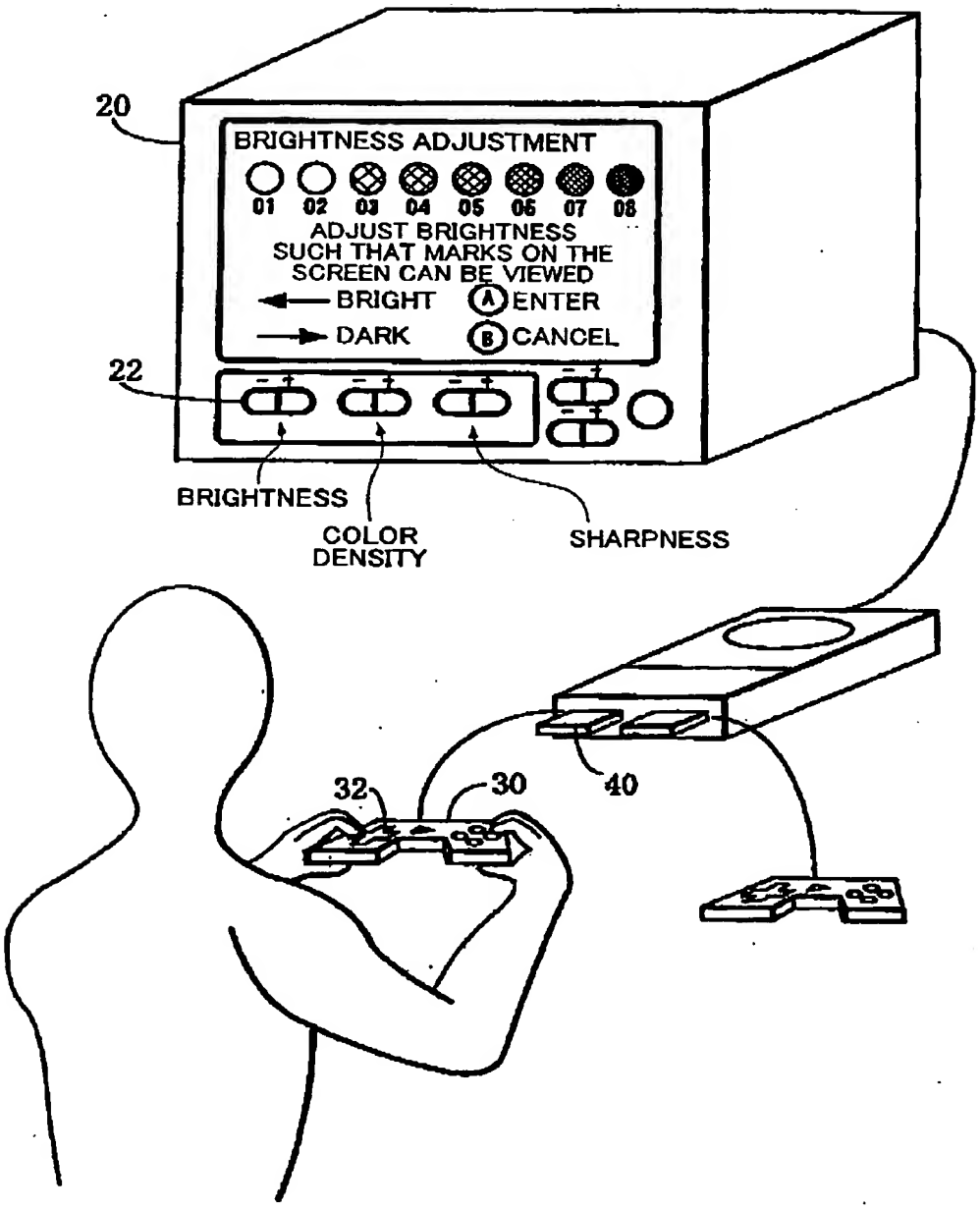

20
BRIGHTNESS ADJUSTMENT
01 02 03 04 05 06 07 08
ADJUST BRIGHTNESS SUCH THAT MARKS ON THE SCREEN CAN BE VIEWED
BRIGHT
DARK
A ENTER
B CANCEL
22
BRIGHTNESS
COLOR DENSITY
SHARPNESS
32
30
40

FIG. 35

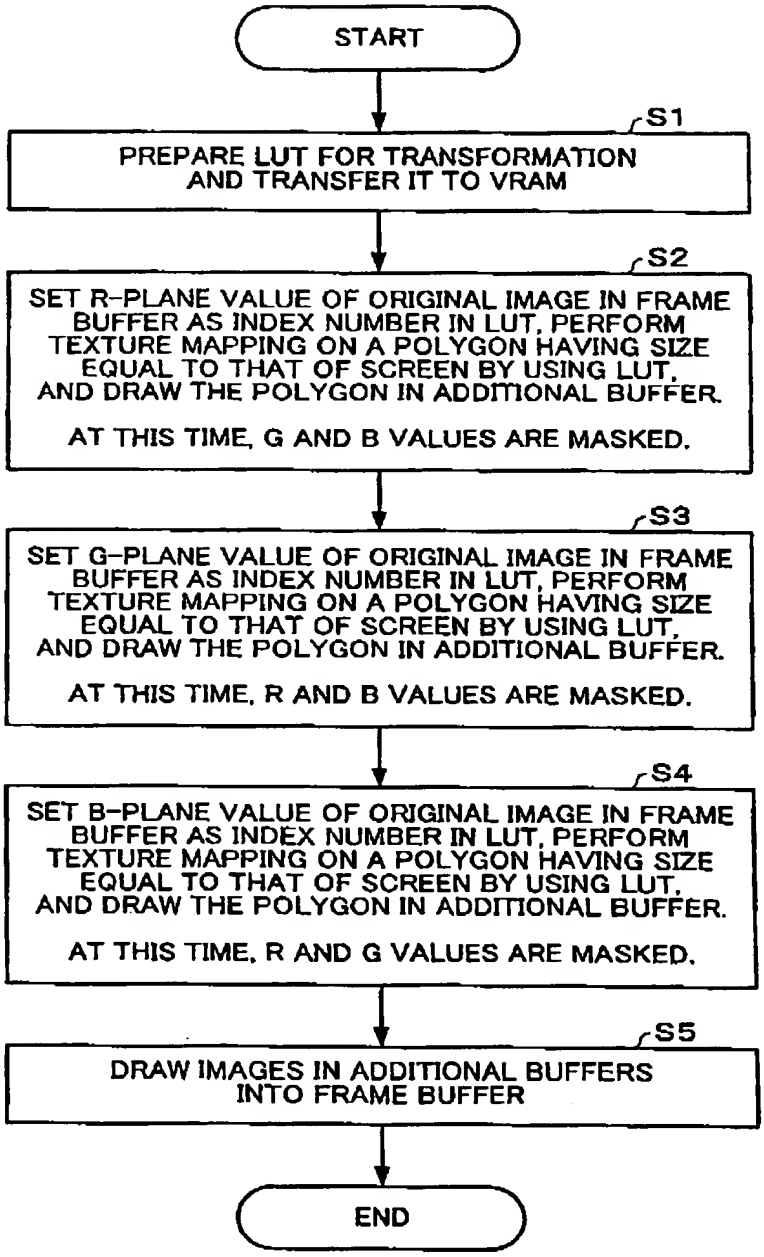

START
S1
PREPARE LUT FOR TRANSFORMATION AND TRANSFER IT TO VRAM
S2
SET R-PLANE VALUE OF ORIGINAL IMAGE IN FRAME BUFFER AS INDEX NUMBER IN LUT, PERFORM TEXTURE MAPPING ON A POLYGON HAVING SIZE EQUAL TO THAT OF SCREEN BY USING LUT, AND DRAW THE POLYGON IN ADDITIONAL BUFFER.
AT THIS TIME, G AND B VALUES ARE MASKED.
S3
SET G-PLANE VALUE OF ORIGINAL IMAGE IN FRAME BUFFER AS INDEX NUMBER IN LUT, PERFORM TEXTURE MAPPING ON A POLYGON HAVING SIZE EQUAL TO THAT OF SCREEN BY USING LUT, AND DRAW THE POLYGON IN ADDITIONAL BUFFER.
AT THIS TIME, R AND B VALUES ARE MASKED.
S4
SET B-PLANE VALUE OF ORIGINAL IMAGE IN FRAME BUFFER AS INDEX NUMBER IN LUT, PERFORM TEXTURE MAPPING ON A POLYGON HAVING SIZE EQUAL TO THAT OF SCREEN BY USING LUT, AND DRAW THE POLYGON IN ADDITIONAL BUFFER.
AT THIS TIME, R AND G VALUES ARE MASKED.
S5
DRAW IMAGES IN ADDITIONAL BUFFERS INTO FRAME BUFFER
END

FIG. 36

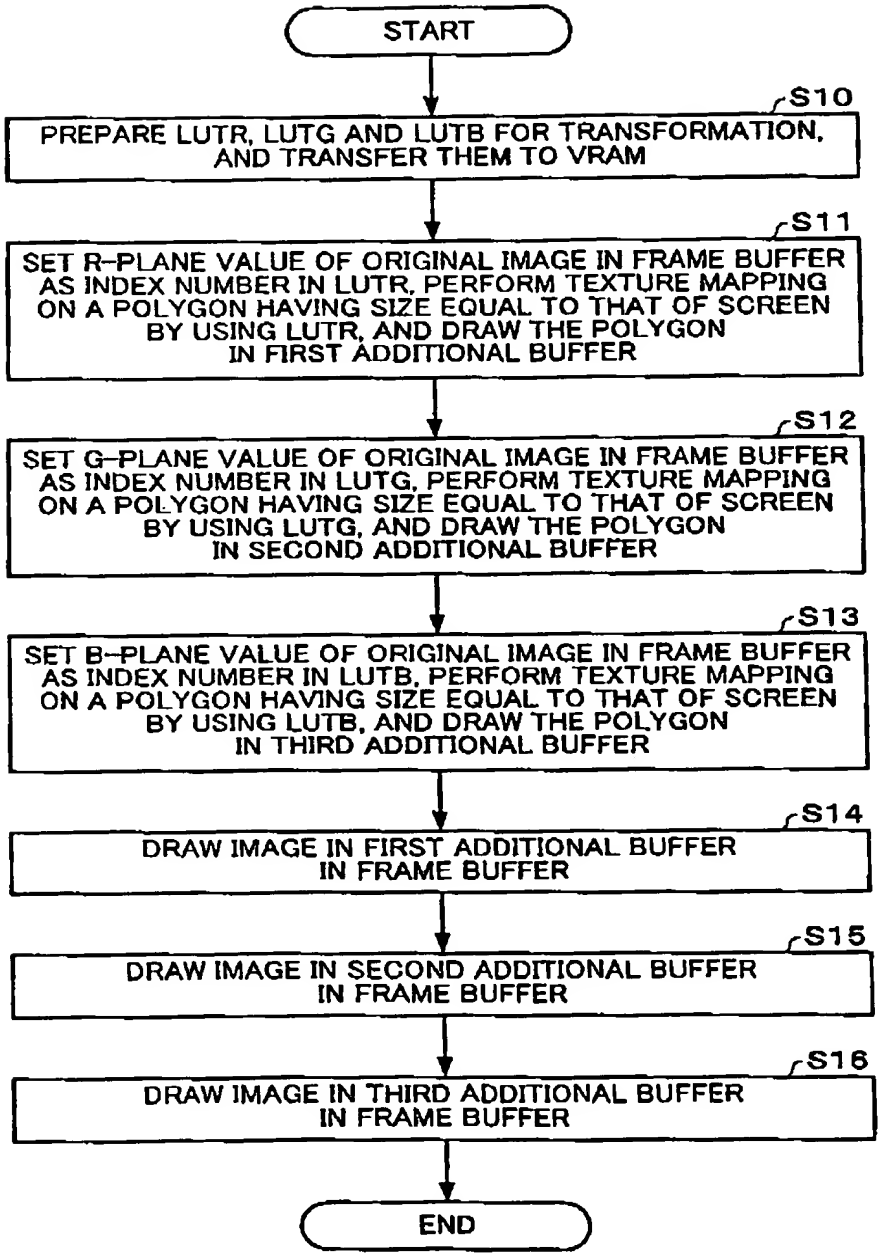

START
S10
PREPARE LUTR, LUTG AND LUTB FOR TRANSFORMATION, AND TRANSFER THEM TO VRAM
S11
SET R-PLANE VALUE OF ORIGINAL IMAGE IN FRAME BUFFER AS INDEX NUMBER IN LUTR, PERFORM TEXTURE MAPPING ON A POLYGON HAVING SIZE EQUAL TO THAT OF SCREEN BY USING LUTR, AND DRAW THE POLYGON IN FIRST ADDITIONAL BUFFER
S12
SET G-PLANE VALUE OF ORIGINAL IMAGE IN FRAME BUFFER AS INDEX NUMBER IN LUTG, PERFORM TEXTURE MAPPING ON A POLYGON HAVING SIZE EQUAL TO THAT OF SCREEN BY USING LUTG, AND DRAW THE POLYGON IN SECOND ADDITIONAL BUFFER
S13
SET B-PLANE VALUE OF ORIGINAL IMAGE IN FRAME BUFFER AS INDEX NUMBER IN LUTB, PERFORM TEXTURE MAPPING ON A POLYGON HAVING SIZE EQUAL TO THAT OF SCREEN BY USING LUTB, AND DRAW THE POLYGON IN THIRD ADDITIONAL BUFFER
S14
DRAW IMAGE IN FIRST ADDITIONAL BUFFER IN FRAME BUFFER
S15
DRAW IMAGE IN SECOND ADDITIONAL BUFFER IN FRAME BUFFER
S16
DRAW IMAGE IN THIRD ADDITIONAL BUFFER IN FRAME BUFFER
END

FIG. 37

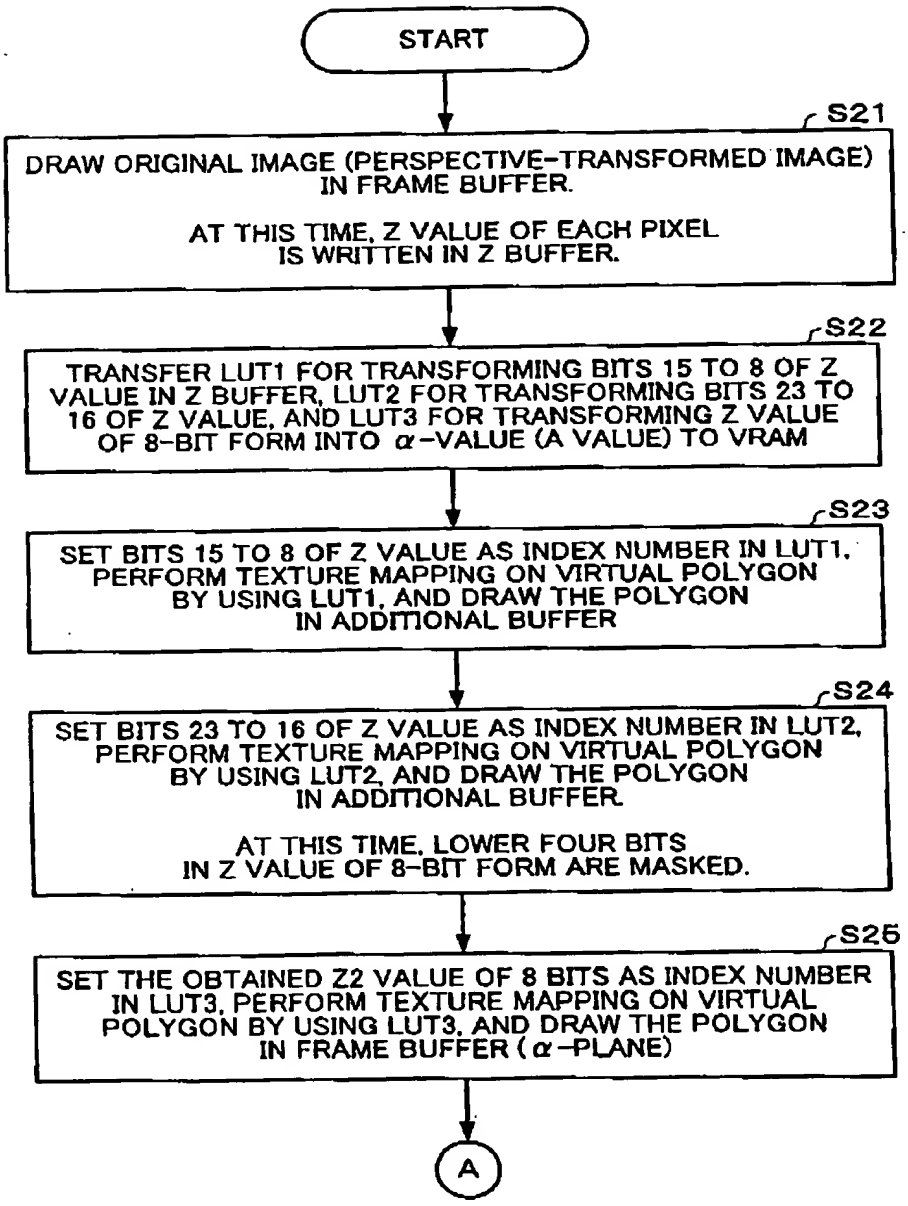


FIG. 38

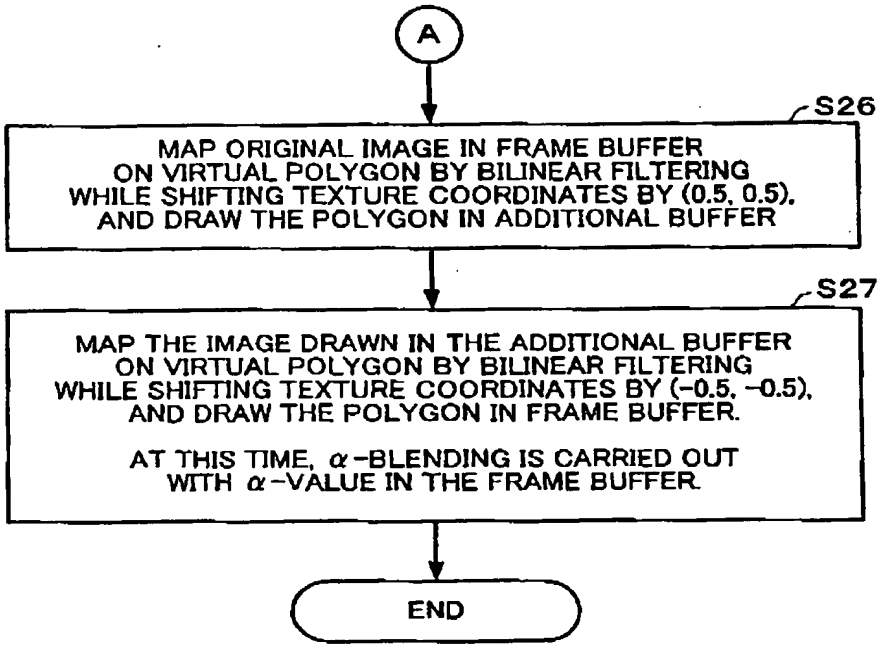
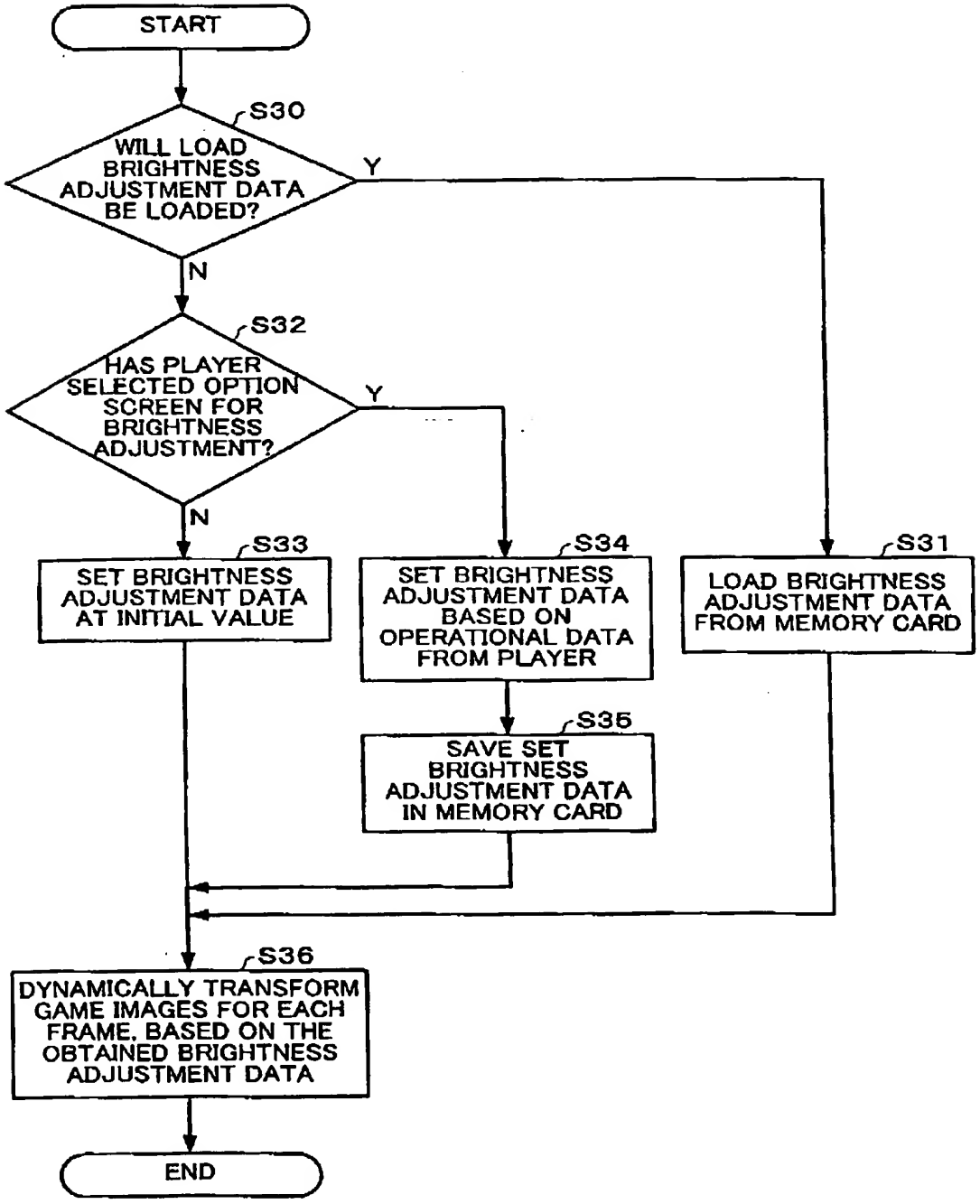

A
S26
MAP ORIGINAL IMAGE IN FRAME BUFFER ON VIRTUAL POLYGON BY BILINEAR FILTERING WHILE SHIFTING TEXTURE COORDINATES BY (0.5, 0.5), AND DRAW THE POLYGON IN ADDITIONAL BUFFER
S27
MAP THE IMAGE DRAWN IN THE ADDITIONAL BUFFER ON VIRTUAL POLYGON BY BILINEAR FILTERING WHILE SHIFTING TEXTURE COORDINATES BY (-0.5, -0.5), AND DRAW THE POLYGON IN FRAME BUFFER.
AT THIS TIME, α-BLENDING IS CARRIED OUT WITH α-VALUE IN THE FRAME BUFFER
END

FIG. 39


START
S30
WILL LOAD BRIGHTNESS ADJUSTMENT DATA BE LOADED?
Y
N
S32
HAS PLAYER SELECTED OPTION SCREEN FOR BRIGHTNESS ADJUSTMENT?
Y
N
S33
SET BRIGHTNESS ADJUSTMENT DATA AT INITIAL VALUE
S34
SET BRIGHTNESS ADJUSTMENT DATA BASED ON OPERATIONAL DATA FROM PLAYER
S35
SAVE SET BRIGHTNESS ADJUSTMENT DATA IN MEMORY CARD
S31
LOAD BRIGHTNESS ADJUSTMENT DATA FROM MEMORY CARD
S36
DYNAMICALLY TRANSFORM GAME IMAGES FOR EACH FRAME, BASED ON THE OBTAINED BRIGHTNESS ADJUSTMENT DATA
END

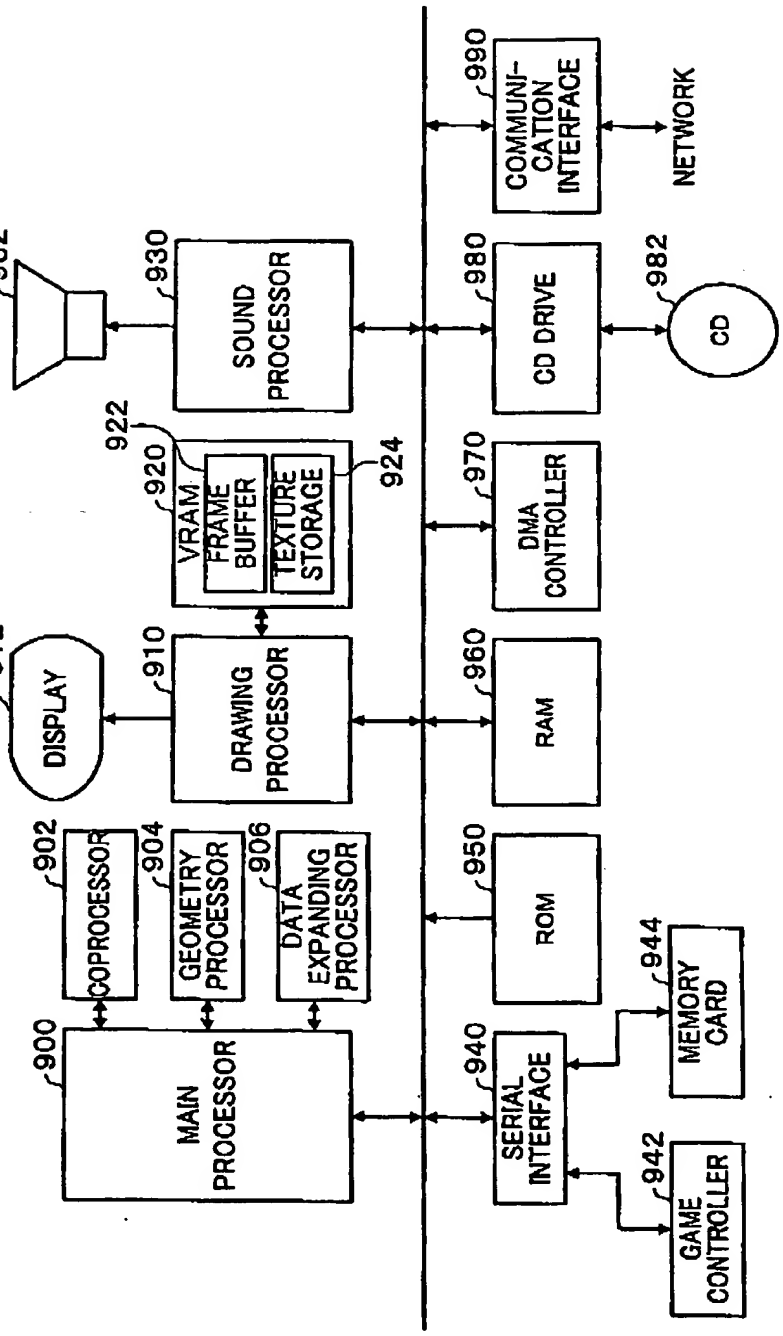


FIG. 40

FIG. 41A

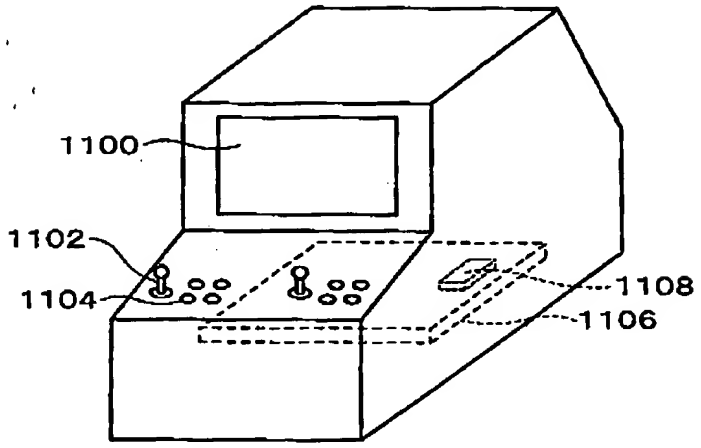


FIG. 41B

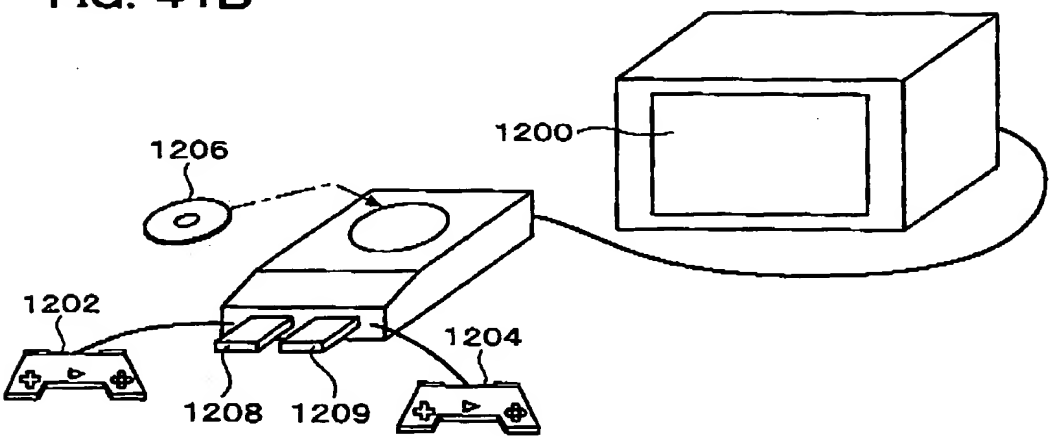


FIG. 41C